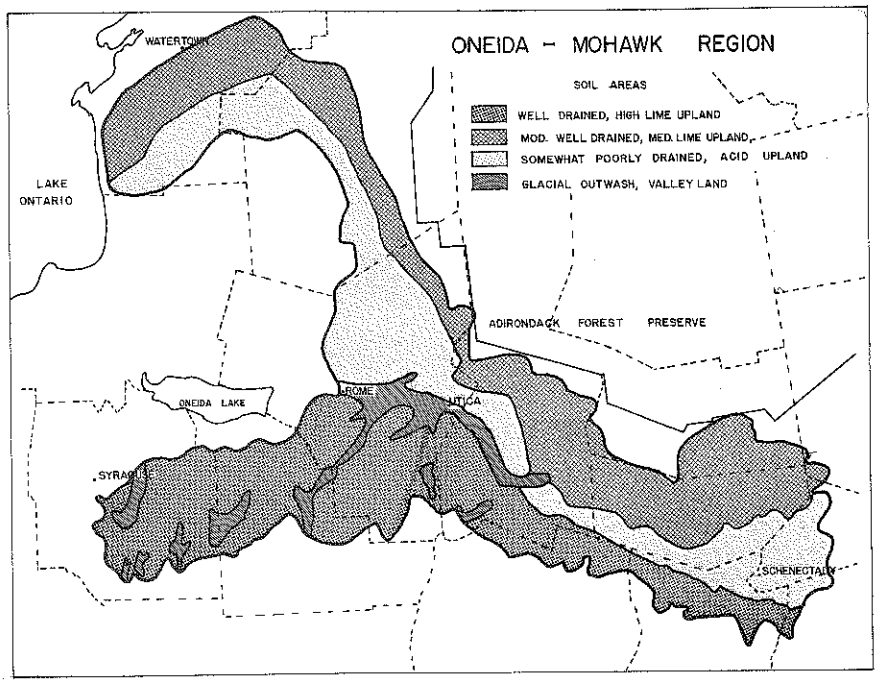
April 1962

A. E. Res. 88

Letters to Report

AN ECONOMIC STUDY OF COMMERCIAL DAIRY FARMS ONEIDA-MOHAWK REGION, NEW YORK 1959-60

By L. C. Cunningham



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INTRODUCTION

This report consists of a series of letters which present preliminary results of an economic study of commercial dairy farms located in the Oneida-Mohawk region of New York.

Financial records were obtained for 762 farms for the 12-month period ended April 30, 1960. These farms are a 15 percent sample of full-time farms in the region, with a differential rate used to sample large herds at higher rates than small herds.

There are 14 letters in the series, the first one written in January 1961 and the last in March 1962. They were sent to those cooperating farmers in the survey who requested them and to county agricultural agents, high school teachers of agriculture, college associates and other interested persons. A final report of the study will be published in bulletin form.

Even in a relatively stable industry like dairying many changes are being made, particularly with respect to size of operation and amount of mechanization. The series of letters made it possible to report some results of the study much sooner than the conventional printed bulletin method. Another worthwhile advantage of the procedure was the stimulation of ideas about analysis of the data during the progress of the study.

The Oneida-Mohawk region is one of five major regions in New York that has been outlined and described. Economic studies similar to this one for the Oneida-Mohawk region have been made for the Central Plain, North Country and Plateau regions. Study of the Hudson Valley region is in the planning stage.

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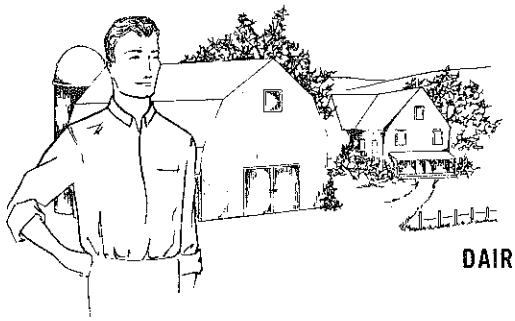
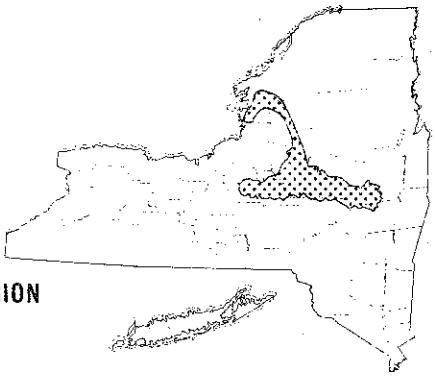




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 1

January 2, 1961

To Farmers Visited on
Farm Management Survey:

Your card has been received and we are glad to place your name on the list to get the series of letters. This letter number 1 tells how the farms were sampled, reports the counts of farms and other places in the sample road segments, and describes the different soil areas of the Oneida-Mohawk region.

Sample of Farms

This study is based on a random sample of the commercial dairy farms in the region. Farms with large herds were sampled at higher rates than those with small herds.

The first step in the sampling procedure was to locate on detailed maps all of the dairy farms in the region. Next, the roads were divided into pieces or segments each containing 6 dairy farms. Samples of these road segments were then drawn as follows:

A. One sample of 54 segments was drawn in which farms with 6 or more cows were enumerated. This gave 223 farm records.

B. Another sample of 36 segments was drawn in which farms with 20 or more cows were enumerated - a total of 117 records.

C. A third sample of 221 segments was used in which farms with 40 or more cows were enumerated - a total here of 254 records.

Records were obtained on 85 percent of the eligible farms in these sample segments. This is tangible evidence of the excellent cooperation received from farmers in the study.

In addition, all other farmers with 60 or more cows were contacted. Records were obtained on 173 farms in this group. For this study, crop-dairy combinations, institutional farms and large estates were excluded.

To show the actual sampling rates by size-of-herd groups, the numbers of farms enumerated were compared with the numbers of all commercial dairy farms in the region. The rates ranged from 4 percent for farms with small herds to 25 percent in the group

of farms with 40 to 59 cows. Ninety percent of the farms with 60 or more cows were included:

Number of cows	Number of farms in sample	Percent sample farms are of all farms
6 to 19	33	4
20 to 39	191	7
40 to 59	273	25
60 or more	270	90

Sampling at higher rates among large herds provides sufficient numbers of records to permit sorting of them to study relationships.

As will be explained later, only parts of most of the counties are included in this Oneida-Mohawk region. One hundred or more records were obtained in Oneida, Herkimer and Lewis Counties:

County	Number of records
Fulton	25
Herkimer	129
Jefferson	90
Lewis	100
Madison	95
Montgomery	91
Oneida	150
Onondaga	37
Otsego	17
Schoharie	30
Albany	1
Schenectady	2
Total	767

Large farms, those with 60 or more cows, were widely distributed throughout the region.

Farms and Other Dwelling Places

Counts were made of all dwellings in the sample road segments in the open countryside of the region. Nearly 75 percent of all the places were rural residences. They were occupied mostly by people with no direct interest in farming.

About 20 percent of the places were commercial farms run by essentially full-time operators. Ninety-two percent of these commercial farms were dairy farms and 8 percent of them were poultry, crop and other types of farms.

The other 5 percent of the places were part-time farms, whose occupants had off-farm jobs and also did some farming. The intermingling of farm and rural non-farm families has important effects on roads, schools and social institutions in rural areas.

Soil Areas

Among the soils of New York State, most of the soils of this region have a relatively high productivity rating. This is attested too by the comparatively dense dairy cattle population in the region. There is, however, considerable variation in the soils within the region. Professor Cline and his associates of the Agronomy department divided the region into 4 major soil areas for purposes of this study (see map on back of this letter). How well do you know the comparative soil resources of your area and region?

Well-drained, high-lime upland. The western part of the region was defined to include the well-drained, high-lime upland soils in Onondaga, Madison and Oneida Counties. These soils extend in a narrower belt eastward across southern Herkimer, northern Otsego and northern Schoharie Counties; they mark the southern boundary of the region. This soil area, in which Honeoye soils are dominant, is similar to much of that in the Central Plain region of western New York, except that elevations are higher, the growing season is shorter, and topography is less favorable.

Moderately well-drained, medium-lime upland. Moderately well-drained, medium- to high-lime upland soils form a belt extending through the middle of the region. This soil area begins in Jefferson County, extends through the heart of the Black River valley and across a narrow strip of Oneida County. It widens through Herkimer and Montgomery Counties and its eastern end marks part of the boundary of the region. The loamy Nellis soils predominate in Jefferson and Lewis Counties. From Herkimer County eastward, Mohawk and Poland soils associated with dark-colored calcareous shales predominate. Some small areas of coarser-textured acid soils adjacent are included. These are mainly in eastern Fulton County and elsewhere around the Adirondack fringe.

Somewhat poorly-drained, acid upland. The third major soil area includes the somewhat poorly drained, strongly acid upland soils which extend from southern Jefferson County along the eastern face of the Tug Hill Plateau into the Mohawk Valley and eastward to Schenectady County. It crosses the Mohawk River in Herkimer County and extends eastward across Montgomery County. Camroden soils with their fine-textured clayey subsoils predominate.

Glacial outwash valley land. The fourth soil area includes the glacial outwash terraces found on the valley floors of the region. These deep, gravelly soils are predominantly Palmyra or Howard series south of the Mohawk River. Those north of the river near Utica are mainly Chenango.

The farm records were grouped according to these 4 major soil areas as follows:

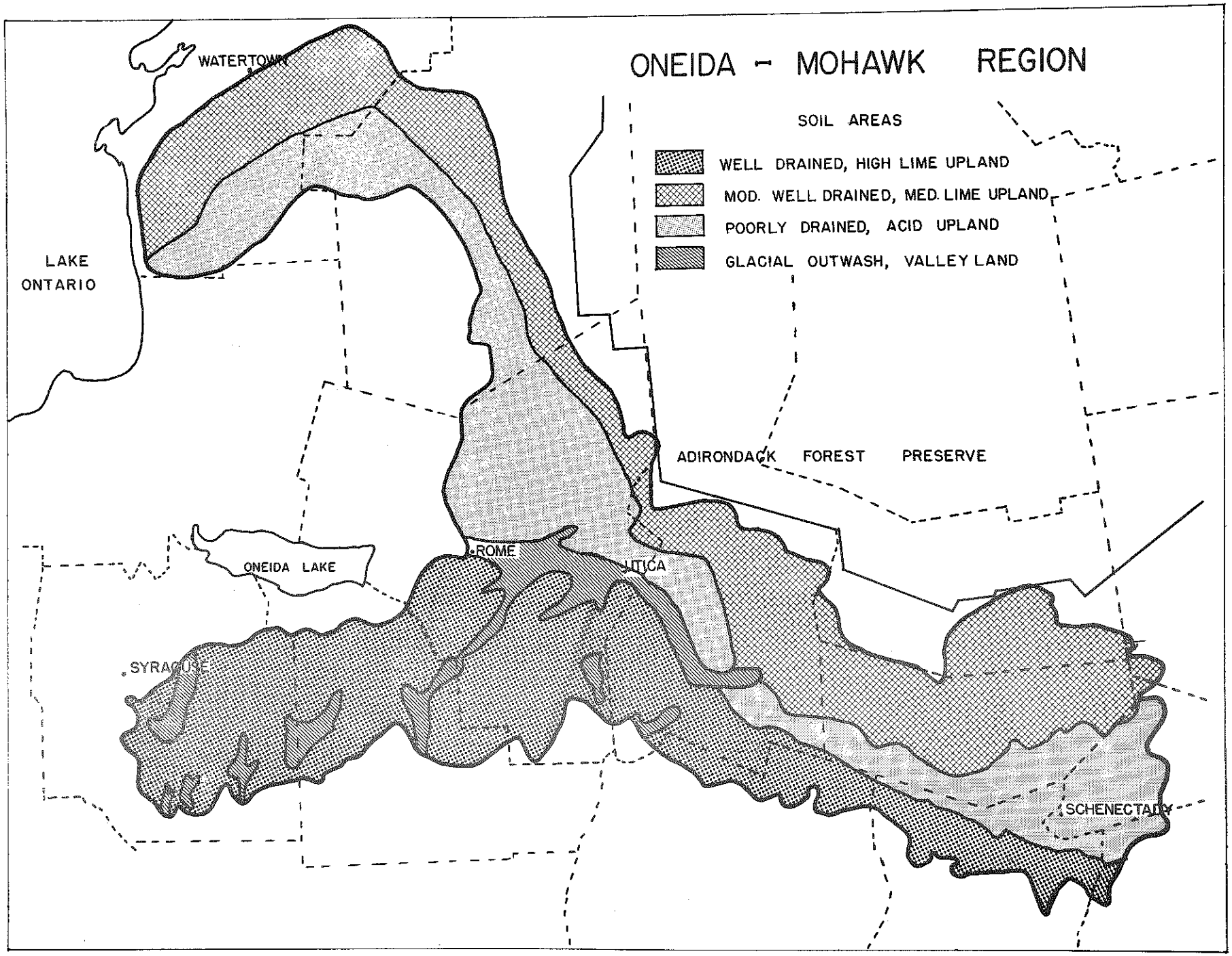
Soil areas	Number of records
1. Well-drained high-lime upland	274
2. Moderately well-drained medium-lime upland	317
3. Somewhat poorly-drained, acid upland	129
4. Glacial outwash valley land	47
Total	767

With this background of the soils of the region and of how the sample of farms was drawn, the next letter will contain a description of the crops raised in the region.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist


ONEIDA - MOHAWK REGION
SOIL AREAS
WELL DRAINED, HIGH LIME UPLAND
MOD. WELL DRAINED, MED. LIME UPLAND
POORLY DRAINED, ACID UPLAND
GLACIAL OUTWASH, VALLEY LAND
WATERTOWN
LAKE ONTARIO
ADIRONDACK FOREST PRESERVE
ROME
UTICA
ONEIDA LAKE
SYRACUSE
SCHENECTADY

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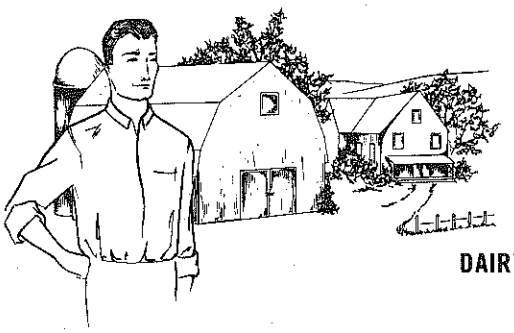
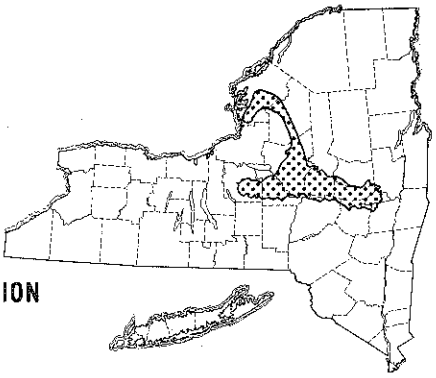




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 2

February 24, 1961

To Farmers Visited on
Farm Management Survey:

Some of the facts about 1959 crop production on the farms surveyed in the region are reported in this letter. These include acreages, yields, soils, intensity of stocking the cropland, hay harvest dates, and amounts of roughages. Good performance of crop production is a first step in successful dairy farming.

Use of land. The average size of the commercial dairy farms in the region was a little over 200 acres per farm, with nearly 100 acres of crops and 77 acres of pasture:

Land use	Acres per farm
Crops	99
Pasture	77
Woods	30
Farmstead & other	11
Total	217

In this study, all of the land operated as one unit, whether or not it was owned, was included as one farm.

The total acreage ranged from 130 acres per farm for the 6 to 19-cow group to about 450 acres for the group of farms with 60 or more cows. The percentages of land in crops and in pasture were about the same in all size-of-herd groups.

Use of cropland. The cropland was used mostly for feed crops for the dairy cattle. Nearly 80 percent of the cropland was used for roughage production - hay, corn, grass and other silages. Another 17 percent of the acreage was in oats and oats and barley mixtures:

Crop	Percent of cropland
Hay	63
Corn for silage	12
Grass silage	2
Other silages	1
Oats	15
Oats & barley mix.	2
Other crops	5
Total	100

Corn for grain and wheat were each less than 2 percent of the total crop acres. Numerous other crops were raised on some farms, but these

accounted for only 2 percent of all cropland.

The large farms had a lower percentage of hayland but a higher proportion of corn for silage than did the small farms - a shift to provide more roughage. Grass silage was also somewhat more important on large farms. Oats and oats and barley mixtures were raised on about the same percentage of the cropland, regardless of herd size. There was more corn for grain but less wheat on large farms.

Percentage of farms having selected crops. All of the farms harvested hay, except for two of them. They bought all of their hay. Corn silage and oats were also common crops - raised on some 85 percent of the farms. About one-fourth of the farms had some grass silage. Nine percent of the farms had other silages, including sudan, oats, sorghum, millet, and mixtures of these crops. One farm in three harvested corn for grain. Only 7 percent of the farms raised wheat. Crops were green-chopped for feed on 8 percent of the farms.

Corn for silage was produced on about 90 percent of the large farms, but on only 60 percent of the 6 to 19-cow farms. Likewise, more than a third of the large farms put up grass silage, compared to only 6 percent of the small farms and 17 percent of the 20 to 39-cow farms. The practice of green-chopping crops for feed was apparently unrelated to herd size.

Several other crops were raised, mainly for sale, on a few farms. These crops included snap beans, dry beans, potatoes, peas, cabbage, sweet corn, buckwheat, soybeans, and rye. Any one of these crops was important on particular farms. The snap bean crop is a good illustration. It was raised on 10 farms, and two of these farms had 200 acres each. Of course, specialized crop farms and even farms with dairy cows but with more than 50 percent of gross receipts from non-dairy sources were not enumerated in this survey. Five farms had some land in the soil bank.

Average yields of major crops. Average yields per acre of some crops in the region were equal to or above state averages. Corn silage yields of 10.5 tons per acre were just equal to state average, but above state averages were hay yields of 2.0 tons per acre and oats of 58 bushels per acre. Yields per acre of corn for grain, 49 bushels, and of wheat, 24 bushels, were both below state averages:

Crops	Yield per acre	
	Region	State
Hay, tons	2.0	1.8
Corn silage, tons	10.5	10.5
Oats, bu.	58	54
Corn for grain, bu.	49	53
Wheat, bu.	24	30

Hay, corn for grain and wheat yields were markedly higher on large farms than on small farms. For instance, hay production of 2.4 tons per acre was harvested on large farms, but only 1.8 tons per acre on small farms.

The 1959 crop season in the region was reasonably normal. Some drought in the eastern part was reported. Ice sheets during the 1958-59 winter damaged legume stands in this and other regions, but the 1959 average hay yield

in the state was higher than any of the previous 5 years, except one, and only one-tenth of a ton per acre below that year.

Soil areas and crop yields. The average yield of hay was nearly one-half ton per acre higher in the area of well-drained high-lime soils than in the area of somewhat poorly drained, acid soils. The yield was highest on the valley soils:

Soil area	Tons hay per acre
Upland	
Poorly dr., acid	1.7
Mod. dr., med. lime	1.9
Well dr., high lime	2.1
Valley	
Glacial outwash	2.3

Corn silage yields were similar in the different areas, but averaged about one ton per acre higher on the better-drained soils. Also oat yields were about 10 bushels higher on such soils.

Cropland and cows. The average of all farms had 99 acres of cropland and 33 cows per farm, or 3.0 crop acres per cow.

The farms with small herds were stocked lightly relative to the cropland. Those with 6 to 19 cows, averaging 14, had 55 acres of crops, or 3.8 crop acres per cow. In contrast, the farms with herds ranging in size from 40 to 59 cows, averaging 46, had 130 acres of crops, or only 2.8 acres per cow. The farms with the largest herds, 60 or more cows, were also stocked heavily:

Cows per farm		Crop acres per farm	Crop acres per cow
Range	Average		
6 to 19	14	55	3.8
20 to 39	28	86	3.1
40 to 59	46	130	2.8
60 or more	76	208	2.7

As we shall see later, the rate of stocking had an important effect on crop yields. What is your situation with respect to cropland and cows? To calculate it, divide the total acres of crops you harvested in 1960 by the number of milk cows in your herd during the 12-month period of that crop season and the following winter. In the present era of rapid changes in herd size, the adjustment of cropland is sometimes neglected. Also, it is frequently easier to add cows than to obtain additional cropland.

Intensity of stocking and crop yields. The greater the intensity of stocking the cropland with cattle, the higher the crop yields. For example, farms with less than 2.0 crop acres per cow had hay yields that averaged 3.0 tons per acre. At the other extreme, those with 5.0 or more crop acres per cow had only 1.6 tons of hay per acre. In the intermediate groups of farms, the same relationship held true:

Crop acres per cow	Tons hay per acre
Less than 2.0	3.0
2.0 to 2.9	2.6
3.0 to 3.9	2.2
4.0 to 4.9	1.8
5.0 or more	1.6

Likewise, with corn silage and oats, the more intensively the farms were stocked, generally the higher the yields of these crops.

Hay equivalent harvested per farm and per cow. In addition to the 126 tons of hay harvested per farm, there were 127 tons of corn for silage, 17 tons of grass silage and 8 tons of various other roughages. In terms of hay equivalent (3 tons of silage or 5 tons of green-chopped feed equal to 1 ton of hay equivalent), the total amount of these crops harvested was equal to 182 tons per farm:

Crop	Actual tons	Hay equiv. tons
Hay	126	126
Corn silage	127	42
Grass silage	17	6
Other roughage		8
Total		182

The total quantity of roughage harvested divided by the number of milk cows in the herd, 33, gives 5.6 tons of hay equivalent per cow. This figure includes the roughage for the cows and the accompanying stock on the farm. Not all of this amount was consumed by the animals, however, because of storage losses and waste. Also, hay was sold from a few farms.

Variation in amount of hay equivalent per cow. The amount of roughage harvested per cow varied widely from one group of farms to the next. Fifteen percent of the farms harvested less than 4.0 tons per cow and another 23 percent had only 4.0 to 4.9 tons. At the other extreme, 17 percent of the farms harvested 6.0 to 6.9 tons per cow and another 17 percent had 7.0 or more tons per cow. This latter group undoubtedly included some farms that green-chopped feed for their cows:

Tons hay equiv. per cow	Percent of farms
Less than 4.0	15
4.0 to 4.9	23
5.0 to 5.9	28
6.0 to 6.9	17
7.0 or more	17
Total	100

Dates of hay harvest. Quality of the roughage is important along with the quantity. Like the quantity, the time of harvest of the first cutting of hay varied widely among the farms. Haying was started on about 30 percent of the farms by mid-June. Nearly 50 percent of them were half done by the end of June, and about 60 percent had completed first cutting of hay by mid-July:

Dates of first cutting hay	Percent of farms
Started by June 15	31
Half done by June 30	46
Completed by July 15	59

The larger the herd, the higher the percentage of farms that started haying by mid-June. For example, hay harvest was started by mid-June on only 15 percent of the 6 to 19-cow farms. On the farms with 60 or more cows, 47 percent started by that date. However, less than two-thirds of the farms, regardless of size of herd, completed first cutting of hay by mid-July.

Hay yields and crop acres per cow. A major goal of the cropping system on a dairy farm is a plentiful amount of

high-quality roughage. High yields of the roughage crops contribute to this goal. Intensive stocking of the cropland increases yields, as has been shown, but this effect is offset by the reduced cropland per cow.

Various combinations of hay yield and crop acres per cow are shown in the accompanying chart (page 6). The farm records were first sorted by the number of crop acres per cow into 3 groups. Next, each of these groups was sorted by the tons of hay per acre into 3 groups, making 9 combinations in all. The amount of hay equivalent per cow for each group was then tabulated.

Twenty-eight farms had low hay yields and less than 2.3 crop acres per cow. Only 3.3 tons of hay equivalent per cow was harvested on these farms, on the average. Another 136 farms also had low hay yields but 3.3 or more crop acres per cow. They had 5.8 tons of roughage per cow. This was about half a ton more than that on the 95 farms with high hay yields, but with intensive stocking. The largest amount of roughage - 7.6 tons per cow - was harvested on the 25 farms with high hay yields and with at least 3.3 acres per cow.

The relation of these various combinations of hay yield and intensity of stocking to rates of milk production and profits will be described in a later letter.

You can calculate this important figure for your own farm by filling in the following blanks:

Crop	Tons harvested: Actual		Hay equiv.
Hay	_____	÷ 1	_____
Grass silage	_____	÷ 3	_____
Corn silage	_____	÷ 3	_____
Green-chopped feed	_____	÷ 5	_____
Total	x x		_____
Number of milk cows			_____
Average per cow			_____

Is the figure for your farm above the regional average - 5.6 tons per cow? We consider this one of the best objective tests of your cropping program. Results of this study provide bench marks by which to judge it.

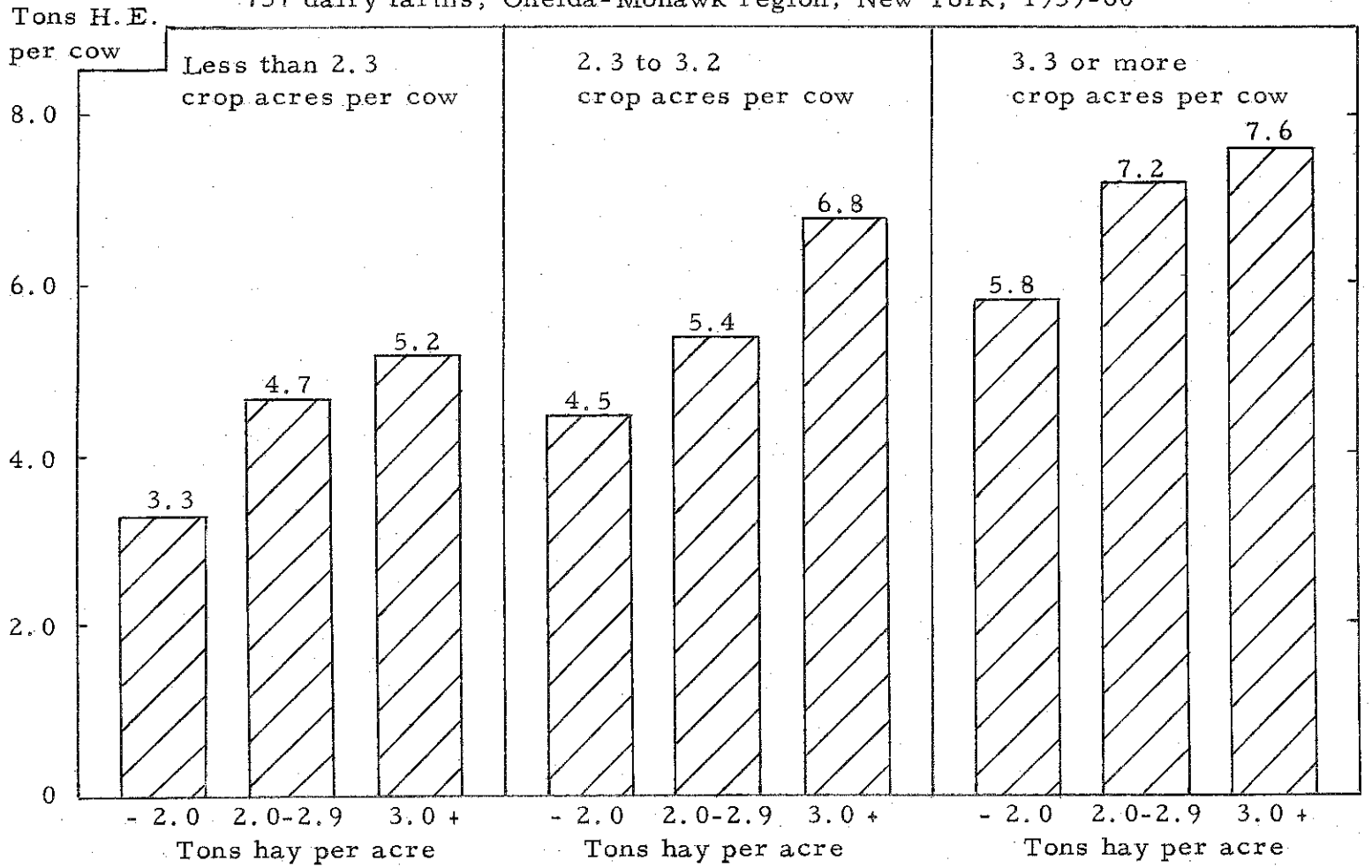
Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

RELATION OF HAY YIELD TO AMOUNT OF ROUGHAGE PER COW,
BY CROP ACRES PER COW

757 dairy farms, Oneida-Mohawk region, New York, 1959-60



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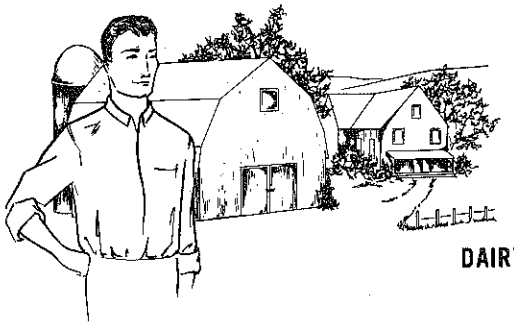
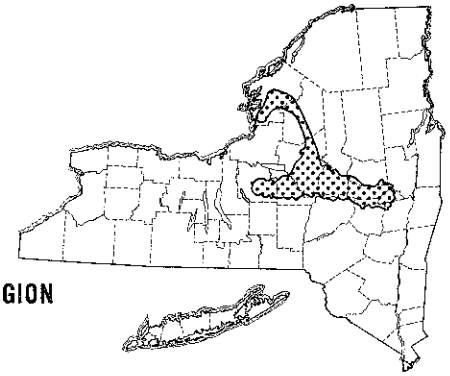




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 3

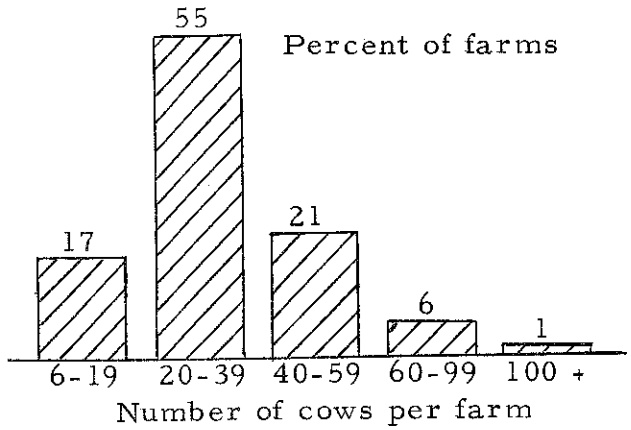
March 28, 1961

To Farmers Visited on
Farm Management Survey:

Numbers of cows kept on different farms, herd replacements, housing of cattle, and rates of milk production are described in this third letter of the series.

Number of cows. With 33 cows per farm, the average size of herd shows the increase that has occurred over the years in this region. But farmer experience with respect to size of herd covers a widening range. In this discussion, keep in mind that all the cows under one management, even though cows were milked in more than one barn, were counted as one herd.

How many small herds are left? Are large herds the rule? Small herds, those of fewer than 20 cows, are still very much in the picture. They accounted for 17 percent of the total herds. The highest proportion of the dairies, 55 percent, was in the size-of-herd range of 20 to 39 cows. Large herds generally attract more attention than their comparative numbers justify. Only 6 percent of the farms had 60 to 99 cows, and one percent had 100 or more:



Large farms, 60 or more cows, were widely distributed throughout the region, but the proportion of them found in the area of poorly-drained, acid soils was only about half as high as the proportion of modal-sized herds, 20 to 39 cows, in that area. On the other hand, in the area of well-drained, high-lime soils, large farms were proportionately a third more common than average-sized farms.

Herd replacements. The farms in the region as a whole are generally self-sufficient with respect to herd replacements, but the number of heifers raised and the number of cows bought in rela-

tion to the number of cows kept varied widely from farm to farm.

There were 18 heifers of all ages per farm. Included were 7 heifers under one year of age, or one for about every 5 cows on hand:

Cattle	Number per farm (end of year)
Milk cows	33.8
Heifers	
2 years or more	3.8
1 to 2 years	7.5
Under 1 year	7.1
Total	18.4

There were 54 heifers of all ages per 100 cows. Large farms had a somewhat lower ratio of heifers to cows than small farms:

Cows per farm	No. of heifers, all ages per farm	per 100 cows
6 to 19	8	57
20 to 39	16	57
40 to 59	24	51
60 or more	42	53

Eight percent of the farms raised no heifer calves in the year of the study. Only a few farms raised surplus heifers to sell. Although the common practice is for dairymen in this region to raise most of their own replacements, some did buy cows at times to bring their herds up to capacity.

Of the total herd replacements, 70 percent were home-raised and 30 percent were bought. However, one-half of the farms bought one or more cows for herd replacement during the year. Only 7 percent of the dairymen bought all of their replacements.

Herd turnover. During the year of the study, 21 percent of the cows were disposed of. This percentage was figured by comparing the number of cows sold, died or eaten during the year with the number on hand at the beginning of the year. Some farms had a low rate of "culling" (under 10 percent), but others had a high rate (30 percent or higher):

Percent of cows culled	Percent of farms
0 to 9	12
10 to 19	41
20 to 29	31
30 or higher	16
Total	100

With some exceptions, it is extremely difficult to get from farmers the sales of cows which were for production purposes. The percentage of cows disposed of is in line with the earlier statement that raising surplus cattle for sale is limited to a few farms in this region.

Method of housing cattle. The milk cows were housed in stall barns on practically all of the farms. Among the 763 farms, there were 10 farms with loose housing, and one of these farms had both systems. All but one of the farms with loose housing had 60 or more cows. Thus, among large farms - 60 or more cows - only 3 farms in every 100 had shifted to loose housing in this region of the state. Commitments in existing barns, observation of mistakes with loose housing, and lack of bedding were common reasons given for continuing to use stall barns.

Among large farms operators, there is considerable interest in milking parlors in conjunction with stall barns.

Five farms included in the study had this combination of facilities.

Of the 267 farmers with 60 or more cows, 209 of them, or 78 percent, milked cows in one barn, 17 percent milked in 2 barns, and 5 percent milked in 3 or more barns.

Milk production. The total amount of milk sold averaged 267,000 pounds per farm and 8,130 pounds per cow. Milk deliveries for each farm were converted from actual to 3.7 percent butterfat test. The New York state average milk production per cow during the period of this study was 7,930 pounds. For the state as a whole, 96 percent of the milk produced is reported sold from farms. Consequently, the state estimate of milk sold per cow is 7,610 pounds. The regional average of 8,130 pounds of milk sold per cow is 7 percent higher than the state average.

Some herds in the region outproduced others by a wide margin. Fifteen percent of the farms had milk sales of less than 6,000 pounds per cow, whereas 17 percent had sales within the range of 10,000 to 11,999 pounds per cow, and 4 percent sold 12,000 pounds or more per cow:

Pounds of milk sold per cow	Percent of farms
Less than 6,000	15
6,000 to 7,999	31
8,000 to 9,999	33
10,000 to 11,999	17
12,000 or more	4
Total	100

Of the entire group of farms, there were just 2 that sold more than 14,000 pounds of milk per cow.

Large herds had more milk sold per cow than small herds. On farms with 6 to 19 cows, milk sales averaged 7,540 pounds per cow, but on farms with 60 or more cows, the average was 8,850 pounds:

Cows per farm	Pounds of milk sold per cow
6 to 19	7,540
20 to 39	8,000
40 to 59	8,690
60 or more	8,850

Where does your herd rank in relation to these averages? To obtain the comparable figure, total the poundage from the milk slips for a year, and divide by the 12 months' average of milk cows in your herd:

1960 year	Your farm
Total pounds of milk sold	_____
Average number of cows	_____
Pounds of milk per cow	_____

Among the soil areas of the region, there were some differences in the level of milk sales per cow. Highest, with an average of 8,540 pounds per cow, was the area of well-drained, high lime soils. Lowest was the area of somewhat poorly drained, acid soils:

Soil area	Pounds of milk sold per cow
Upland	
Poorly dr., acid	7,770
Mod. dr., med. lime	7,880
Well dr., high lime	8,540
Valley	
Glacial outwash	8,180

Yield per acre of both hay and corn silage were comparatively low in the area of somewhat poorly drained, acid soils.

It is interesting to note the combined relationship of herd size and soil area to milk per cow. The farms with herds of 60 or more cows in the area of well-drained, high lime soils had the highest average amount of milk sold per cow of all the groups. This group of 104 farms in the sample sold 9,420 pounds of milk per cow - 16 percent above the region average and 24 percent above the state average.

The foregoing description of size of herd and milk yield per cow shows this to be one of the great dairy regions of the state and the nation. But these facts raise certain questions.

What is the relation of size of herd to labor efficiency and to labor income? Why the wide differences in milk production per cow from one group of farms to the next? What questions do you have that might be answered from the data available in this study? We would welcome receiving them.

Answers to the above questions and those you may send in will be taken up in future letters. The next letter in the series will describe the labor force on these dairy farms.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

COOPERATIVE EXTENSION WORK IN AGRICULTURE
AND HOME ECONOMICS, STATE OF NEW YORK

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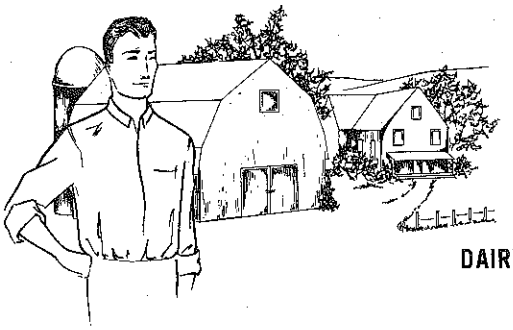
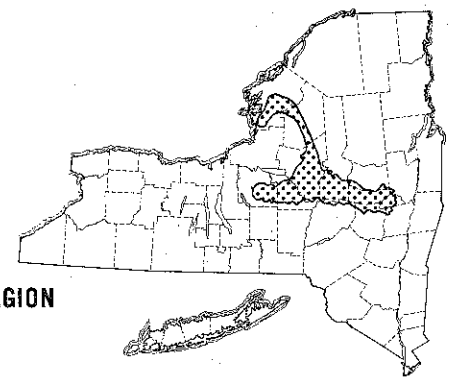




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 4

April 24, 1961

To Farmers Visited on
Farm Management Survey:

Some facts about the labor force on the commercial dairy farms included in the study are described in this letter number 4 of the series.

Operator labor. Since the study is based on full-time farmers, there were at least 12 months of operator labor for each farm. Many of the large farms were operated as partnerships. In this study, only those partnerships were counted in which the partners were full-time. About one farm in 10 was operated as a partnership. In most cases, the partners were sons, brothers or other relatives of the operators. The importance of partnerships increased with the size of operation. They were found on 28 percent of the farms with large herds:

Cows per farm	Percent of farms with partnerships	Average age of operators
6 to 19	0	55
20 to 39	7	46
40 to 59	15	43
60 or more	28	44

The operators of the farms with small herds were about 10 years older than the operators of the other size-of-herd groups.

Family labor. Farm work performed by members of the family was expressed in terms of months equivalent of man time. Such family labor amounted to 3.4 months per farm, and was found on more than 50 percent of the farms. It was included in the farm expenses at a wage allowance of $175 per month in this study.

Family labor amounted to about 2 months per farm on small farms and 4 months on large farms, and was commonly found in all size-of-herd groups:

Cows per farm	Mo. family labor per farm	Percent of farms with family labor
6 to 19	1.8	42
20 to 39	3.7	61
40 to 59	4.0	57
60 or more	3.8	48

Hired labor. Labor hired by the week or month with board amounted to 2.5 months per farm, and was found on 31 percent of the farms. Hired labor without board amounted to 2.0 months per farm, and was found on 17 percent of the farms. Day and hour labor was employed on about one-fifth of the farms, but only in a limited way - equivalent to 13 days, or 0.5 month, per farm.

The proportion of farms with regular hired labor was, of course, higher for large herds than for small herds. Regular help boarded was somewhat more common than help not boarded. Hired labor of one type or the other was found on only 38 percent of the farms with 20 to 39-cow herds, but on about 90 percent of the farms with herds of 60 or more cows:

Cows per farm	Percent of farms with hired labor		
	with board	without board	either or both
6 to 19	9	9	18
20 to 39	27	14	38
40 to 59	51	25	69
60 or more	60	48	89

Wage rates. Help hired by the week or month with board was paid cash wages, on the average, of $115 per month. In addition, estimated cash cost of board at $30 per month was included in the farm expenses. Cash wages of hired help not boarded averaged $194 per month.

Average wage rates were related to size of farm operations. Cash wages per month of help with board ranged from $106 on farms with typical-size herds to about $160 on farms with large herds:

Cows per farm	Cash wages per month	
	with board	without board
6 to 19	--	--
20 to 39	$106	$187
40 to 59	123	204
60 or more	161	221

Man equivalent. All farm labor amounted to nearly 22 months per farm, more than three-fourths of which was performed by the operators and members of their families:

Workers	Months per farm
Operator	12.0
Partner	1.1
Family	3.4
Hired	5.0
Total	21.5

In this region, as elsewhere in New York, the typical commercial dairy farm continues to be essentially a family operation.

The average man equivalent was 1.8 per farm (21.5 ÷ 12). It ranged from 1.2 per farm on small farms to 3.2 on large farms:

Cows per farm	Man equivalent per farm
6 to 19	1.2
20 to 39	1.6
40 to 59	2.2
60 or more	3.2

Your labor force. What was the man equivalent for your farm last year? If there were several workers, put down the number of full-time months for each worker as follows:

Worker	Months
Operator	
Partner	
Sons	
Other family	
Hired	
Total	
Man equivalent (Total months ÷ 12)	

Variation in size of labor force. Within each size-of-herd group of farms, there was some variation in size of labor force. Even with small herds, 6 to 19 cows, two-thirds of the farms had some labor in addition to the operator.

With 20 to 39 cows, the typical labor force was within the range of 1.1 to 2.0 men, although some farms had more and others less labor than that. Among the farms with 40 to 59 cows, nearly one-half of them had a labor force of 1.1 to 2.0 men and another one-half had 2.1 to 3.0 men.

With fewer than 60 cows, only a small proportion of the farms had more than 3.0 men. On the other hand, with 60 or more cows, only about 10 percent of the farms had less than 2.1 men. In this large-herd group, 43 percent of the farms had a labor force within the range of 2.1 to 3.0, and another 30 percent had 3.1 to 4.0 men:

Man equivalent	Number of cows per farm			
	6-19	20-39	40-59	60+
1.0	36	9	1	0
1.1 to 2.0	64	77	44	11
2.1 to 3.0	0	13	49	43
3.1 to 4.0	0	1	5	30
4.1 or more	0	0	1	16
Total	100	100	100	100

Output per man. The average number of milk cows cared for per man was 18. Another measure of labor use is the amount of milk sold per man. It takes into account the kind as well as the number of cows. For all farms, 151,000 pounds of milk was sold per man.

Use of labor in large herds. Is labor used more efficiently in large herds than in small or typical-size herds? To study this question, the farm records were sorted into size-of-herd groups. The number of cows per man was then tabulated for each group. The results are shown in the accompanying graph.

The solid dots in the graph represent the average number of cows per man, plotted from the vertical scale on the left, for each size-of-herd group of farms. The scale for number of cows per farm is on the bottom of the graph. The line drawn through the solid dots represents the average relationship between size of herd and use of labor.

In general, the larger the herd, the higher the labor efficiency. As size of herd increased up to about 45 cows, the increase in number of cows per man was rapid. In herds larger than 45 cows, the increase in efficiency continued right up through the group of largest herds, although the rate of increase was more moderate.

The two dashed lines drawn through the circles on the graph indicate the variability in the number of cows per man. For each group, the circles are plotted so that one-half of the farms fall within those limits. Hence the wider the spread between these lines, the greater the variability.

There was no difference in variation from the average number of cows per man in the groups of herds up through the 70 to 79-cow group.

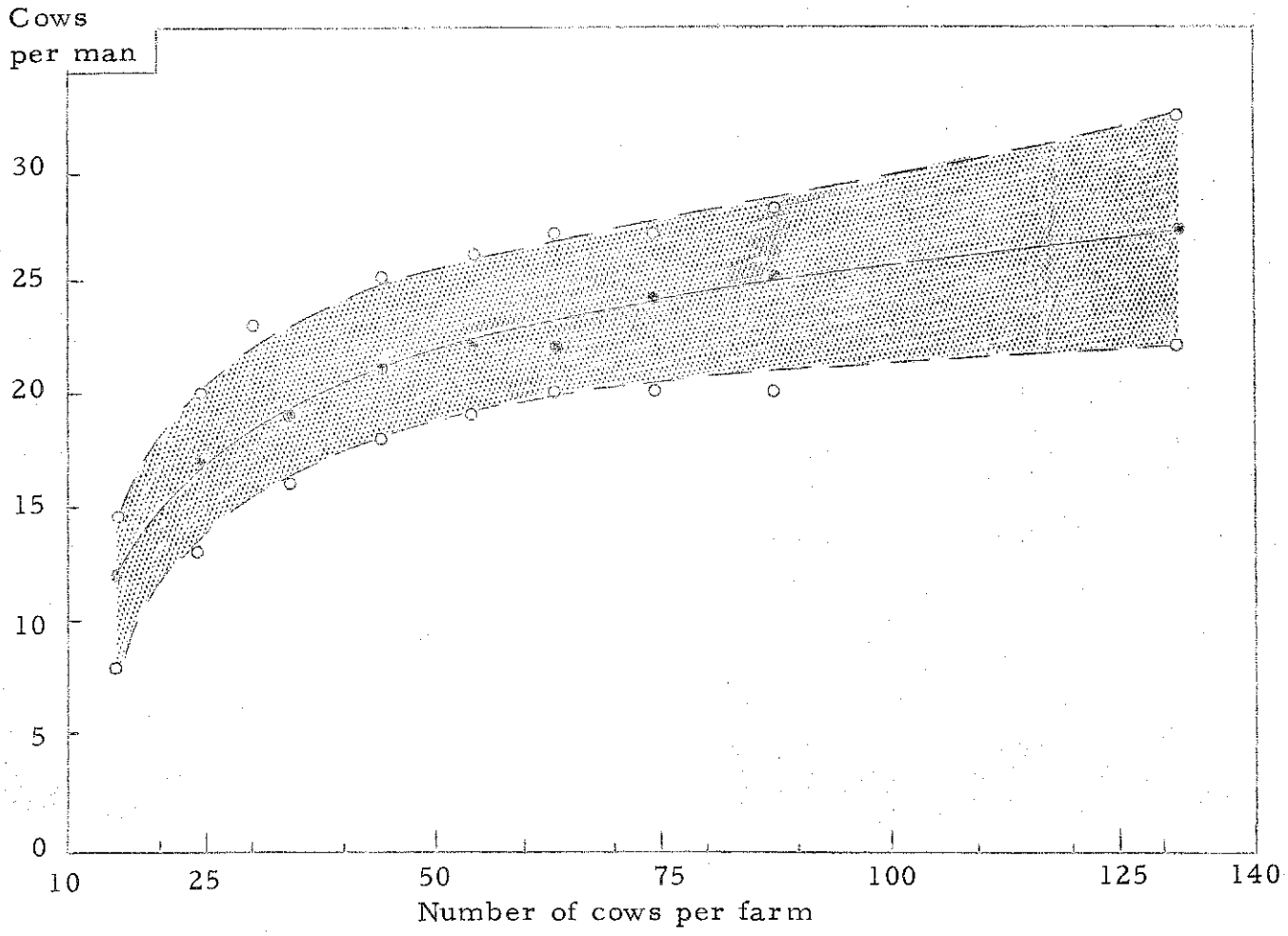
Among the two largest groups of herds, the variability was greater, however, as indicated by the divergence of the lines. The average number of cows per man in the group of herds of 100 or more cows was 27, but the number per man on different farms varied more widely from the average than was true in the small and medium-size herds.

The use of labor is, of course, affected by the amount of power and machinery on the farm. The trend toward increased size of herd has been speeded up by the use of more and more equipment. Our next letter will contain a description of the mechanization of these dairy farms.

Yours truly

L. C. Cunningham

L. C. Cunningham
Extension Economist



RELATION OF SIZE OF HERD TO USE OF LABOR
Oneida-Mohawk region, New York, 1959-60

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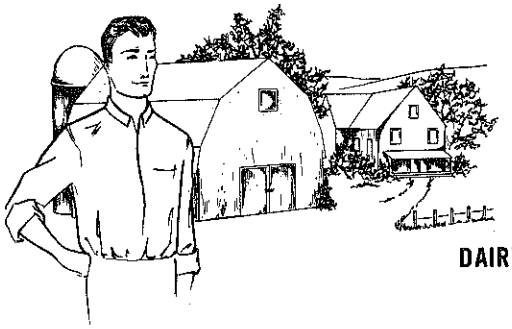
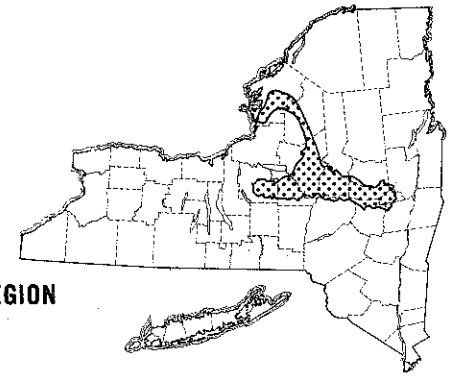




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 5

May 17, 1961

To Farmers Visited on
Farm Management Survey:

How much do you have invested in power and machinery? What did it cost to operate this phase of your farm business last year? Some facts gathered from the survey farms are presented to help you judge the answers to these and other important questions.

Inventory values and expense of operation of all power and machinery on each farm were enumerated. First, let us look at the percentage of farms in each size of herd group that had certain major pieces of equipment.

Forage equipment. The proportion of farms with hay balers ranged from about 50 percent for small farms to more than 90 percent for large ones.

Very few small farms and about one-half of the farms in the 20-39-cow group had field choppers. Since they can ill-afford both, operators of small farms might better own field choppers and chop hay rather than own balers. The chopper can be used, of course, for harvesting corn and grass for silage as well.

Mow dryers were not very common. Fifteen percent of the large farms had them.

Nearly one-half of the 40-59-cow farms and three-fourths of the 60-or more-cow farms had hay conditioners, despite the relative newness of this tool.

One-fourth of the large farms had mechanical silo unloaders:

	Cows per farm			
Machines	6-19	20-39	40-59	60+
	Percent of farms			
Baler	55	88	93	99
Chopper	15	49	71	92
Mow dryer	12	3	10	15
Conditioner	6	28	48	72
Silo unloader	3	5	16	25

Other equipment. Although still not common (12 percent) on typical-size farms, about 40 percent of the large farms had bulk milk tanks.

Milk pipelines or dumping stations in dairy stables were found on one farm in about ten of the large farms.

Only one farm in 3 of the typical-size farms had a mechanical gutter cleaner. Among large farms, 3 farms out of 4 were so equipped:

Equipment	Cows per farm			
	6-19	20-39	40-59	60+
	Percent of farms			
Bulk tank	3	12	29	41
Pipeline	0	2	3	9
Dump. station	0	2	4	10
Gutter cleaner	3	31	72	76

Investment in power and machinery. The end-of-year investment averaged $9,700 per farm on typical-size farms, but ranged from $5,300 on small farms to $23,000 on large farms.

Despite the fact that the large farms had much more equipment, the investment per cow was about $300 compared with $370 on small farms and $340 on typical-size farms:

Cows per farm	Investment	
	per farm	per cow
6 to 19	$5,350	$369
20 to 39	9,660	343
40 to 59	15,160	332
60 or more	23,080	306

Expense for power and machinery. Depreciation, interest on investment, and operating expenses for the year were calculated for each farm. Charges for farm labor to make repairs, insurance, and housing were not included, however. Credits for income from custom work and gasoline tax refunds were deducted to obtain the net total expense. On the average, the expense amounted to about $4,000 per farm. The two items - depreciation (equal to 15 percent of the end inventory value) and interest on investment (at a 5 percent rate) - accounted for more than one-half of the total:

Items	Expense per farm
Depreciation	$1,684
Interest on investment	534
Gasoline, oil and grease	552
Repairs	479
Tires, license & insurance	152
Bale ties	87
Milk hauling	195
Machine hire	128
Auto (farm share)	189
Electricity (farm share)	207
Total	$4,207
Income from custom work	61
Gasoline tax refunds	82
Total (net)	$4,064

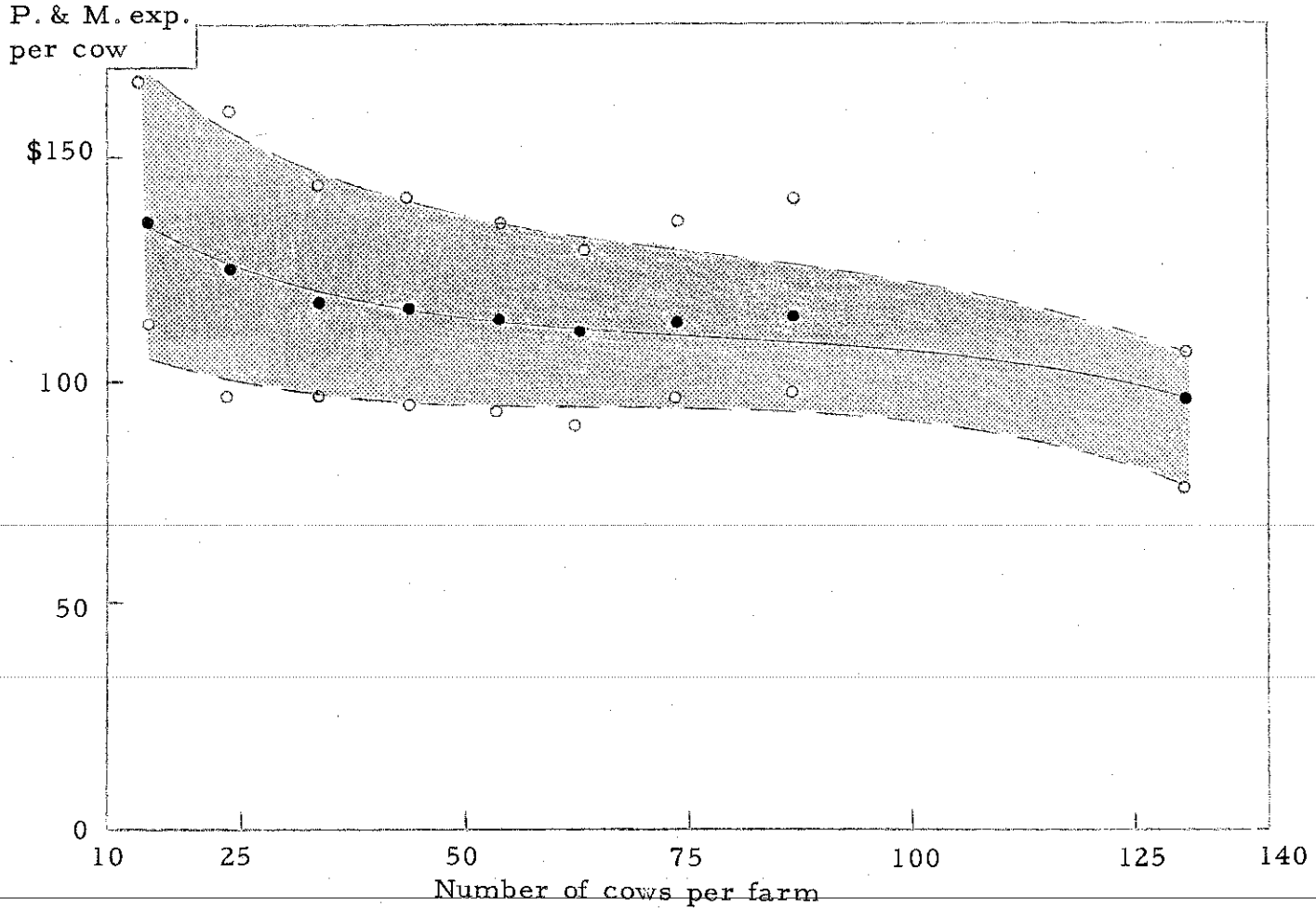
The average expense amounted to $128 per cow, but there was a wide variation from farm to farm. As has been shown, individual farms had different amounts of machinery. On the 10 percent of the farms with the smallest expense per cow, the amount was only $70. But on the 10 percent of the farms with the largest expense, the figure was $220, or 3 times as much.

Expense in large herds. How does this expense per cow vary with size of herd? With the farm records sorted by size-of-herd groups, the expense per cow for each group was tabulated. The results are shown in the accompanying graph.

This graph is constructed similar to the one showing the relation of size of herd to use of labor reported in the

preceding letter. The solid dots in the graph represent the average expense per cow, plotted from the vertical scale on the left, for each size-of-herd group of farms. The scale for number of cows per farm is on the bottom of the graph. The line drawn through the solid dots represents the average relationship between size of herd and power and machinery expense per cow.

The larger the herd, generally speaking, the lower the average expense per cow. At least, the expense was relatively high in small herds and low in large herds. The downward slope of the trend line between these two extreme groups was influenced by the out-of-line expense of the 70-79-cow and 80-99-cow groups. That is to say, there was no significant difference in the average expense per cow in the herds ranging from 30 to 80 cows, because the amount of mechanization increased. Even so, the typical-size herd falling in the range of 30 to 39 cows had $118 of expense per cow, whereas the herds of 60 to 69 cows had only $111. Yet in the latter group, 3 more cows were cared



RELATION OF SIZE OF HERD TO P. & M. EXPENSE PER COW
Oneida-Mohawk region, New York, 1959-60

for and 40,000 pounds more milk was sold per man than on the typical-size farms.

Large herds make possible high labor efficiency. The high efficiency is accomplished in large part by mechanization. Therefore, it is likely that some of the remaining hand-labor jobs, like feeding, on large farms will be mechanized. Some dairymen in the region, whom we like to call innovators, are already trying out different methods. Also many of the types of equipment now found on large farms will be adopted by existing typical-size farms, thus enabling these operators to enlarge their herds and increase their labor efficiency.

The two dashed lines drawn through the circles on the graph indicate the variability in the power and machinery expense per cow. For each group, the circles are plotted so that one-half of the farms fall within those limits. Hence, the wider the spread between these lines, the greater the variation.

The range in expense per cow was comparatively wide in the groups of small herds. This is in contrast to the variability in cows per man in these groups. Some small farms are over-equipped, whereas others have continued with just a minimum amount of tools. Hence, the wide range found in expense per cow. Large farms, on the other hand, are more uniformly equipped with the major tools. The expense per cow varies not so much because some farms have the items and others do not, but because of differences in operating efficiency.

A future letter will report the relation of labor efficiency and mechanization to income. Our next letter will deal with capital investment, farm expenses, farm receipts and labor incomes of the farms included in the study.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

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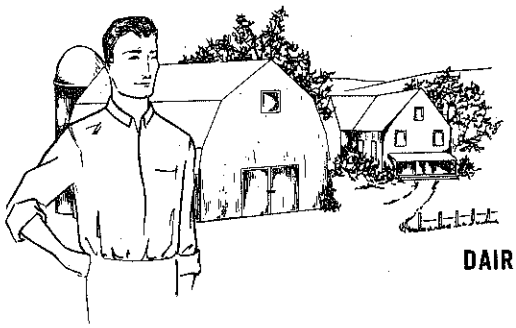

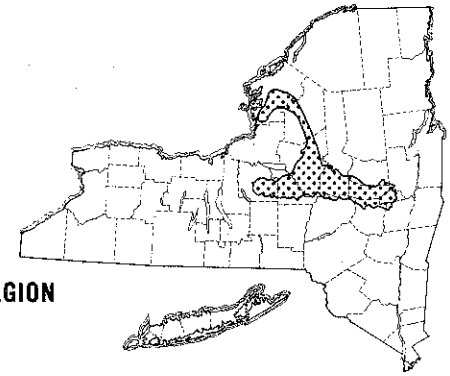

DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 6

July 21, 1961

To Farmers Visited on
Farm Management Survey:

How much capital is invested in a typical dairy farm business in this region? How is this investment distributed among real estate, livestock and equipment? How does the amount of capital vary from farm to farm? This sixth letter contains some figures on these topics.

Average capital per farm. The money invested in these dairy farms averaged about $47,000 per farm. Thus, with a labor force of 1.8 men per farm, capital investment amounted to $26,000 per worker, about $10,000 higher than the average of $16,000 per worker in all manufacturing industry in the nation. The total investment is equal to nearly $1,500 per milk cow in the herds.

To the question 'what is the current market value of the land and buildings used in your operations?' the average of farmers' answers was about $21,000 per farm. Land and buildings consisted of 217 acres (99 acres of crops), dwellings, and barns for 33 cows and accompanying stock. This real estate value, equivalent to about $100 per acre, or $700 per milk cow, amounted to nearly one-half of the total investment.

With cows valued on the average at $305 per head, and young stock priced accordingly, the investment in livestock amounted to $13,500 per farm, or 29 percent of the total.

At current depreciated values, about $11,500 per farm was invested in power and machinery - 24 percent of the total:

Items	Per farm	Percent of total
Land & buildings	$21,440	46
Livestock	13,510	29
Power & machinery	11,530	24
Feed & supplies	570	1
Total	$47,050	100

With the inventory date (April 30) occurring near the end of the barn feeding season, the investment in feeds and supplies on hand was at a seasonal low point and amounted to only one percent of the total capital.

Reported here in this study is the total capital used in the farm business, whether owned or borrowed. Indebtedness was not enumerated. Not included here are household goods, non-farm

share of auto and outside investments.

Variation in capital per farm. Although quite modest in amount on some farms, total capital was very large on others. Differences in size and condition of buildings on different farms are widely observed. It has already been pointed out that some herds were much larger than others, with varying inventory prices of the cattle. From the previous letter, it is evident that not all farms were equally well equipped. All of these differences in physical properties were reflected in differences in the total investment per farm.

Only 7 percent of the farms had less than $20,000 total capital. The range in capital from $40,000 to $60,000 included the largest proportion of the farms - 38 percent. Three percent of the farms had from $80,000 to $100,000 and another 3 percent had $100,000 or more:

Range in capital	Percent of farms
Zero to $20,000	7
20,000 to 40,000	35
40,000 to 60,000	38
60,000 to 80,000	14
80,000 to 100,000	3
100,000 or more	3
Total	100

Considerable variation in capital existed within each size-of-herd group. Among small herds, 6 to 19 cows, total capital averaged about $24,000 per farm. About 40 percent of these farms had under $20,000 and another 40 percent had from $20,000 to $40,000. None had as much as $60,000. Among large farms, 60 or more cows, total capital averaged about $100,000 per farm. None had less than $40,000; 41 percent had at least $100,000.

Additions to capital during year. Net purchases of power and machinery during the year of $2,600 per farm were more than enough to offset depreciation. So there was an increase in inventory of these items from the beginning to the end of the year of $815. Also, the amount spent for new buildings and repairs exceeded depreciation, with a resulting increase in real estate inventory of $676.

There were 2 more cows and 1 more heifer on hand at the end than at the beginning of the year. Therefore, the cattle inventory showed an increase, even though cattle were valued at the same price level at the beginning as at the end of the year. Finally, feeds and supplies inventory showed a moderate increase for the year. Overall, the net increase in capital during the year amounted to about $2,600 per farm.

More and more capital is being used to enlarge the business and mechanize it more fully. Comparisons with previous studies in this region show that since the mid-forties, the amount of capital per man has nearly tripled. What are the financial results? Incomes of the farms surveyed is the subject of our next letter.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

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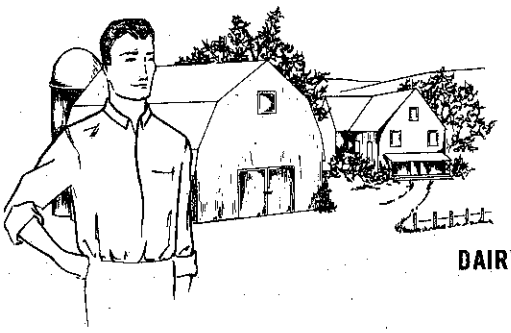
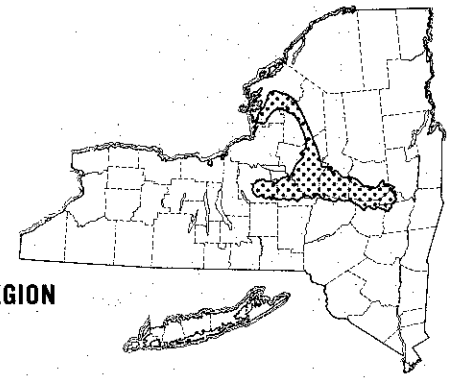




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 7

August 1, 1961

To Farmers Visited on
Farm Management Survey:

Farm operating expenses, inventory changes, receipts and net incomes of dairy farmers surveyed in the region are described in this letter. These figures will provide you with some practical standards by which to judge your own financial operations.

Farm operating expenses. Total operating expenses on the cross-section sample of 223 dairy farms in the region averaged about $9,500 per farm. Feed bought headed the list at $2,800. Some $1,100 was used to buy cattle and other livestock. Cash expenses for hired labor were nearly $1,000. Expenses for power and machinery included about $550 for gasoline, oil and grease, $675 for repairs, $180 for farm share of auto, $187 for milk hauling, and $140 for machine hire. Building repairs were $400, real estate taxes $475, and fire insurance nearly $200.

Crop expenses included $277 for seeds, $316 for fertilizer and $155 for lime. These items were partially offset on the income side by $82 of ACP payments. Veterinary expense averaged $185 per farm. About $100 was spent for dairy supplies and testing, and a similar amount went for breeding fees. The farm share of electric and telephone bills exceeded $250. Many small miscellaneous items came to nearly $500:

Items	Per farm
Feed bought	$2,816
Livestock bought	1,130
Labor hired	920
Gasoline, oil, grease	556
Power & mach. repairs	674
Auto (farm share)	179
Milk hauling	187
Machine hire	140
Building repairs	401
Real estate taxes	475
Fire insurance	194
Seeds	277
Fertilizer	316
Lime	155
Veterinary	185
Dairy supplies & testing	112
Breeding fees	104
Electricity & telephone	261
Miscellaneous	477
Total	$9,559

Note that the foregoing list includes only farm items; no household expenses are listed. Also note that capital outlays for buildings and machinery, allowance for family labor and interest payments are not included. These items are treated later.

Allowance for family labor. The value of family labor, other than operator, was taken into account at $175 per month. This wage allowance amounted to $634 per farm. Being a non-cash item it was not included in the list of operating expenses, but will be taken into account.

Inventory changes. As shown in the previous letter, net purchases of power and machinery were about $2,600 per farm. New buildings amounted to $645, in addition to the repairs of $400. These capital outlays were more than enough to offset depreciation. Also, there were more cattle and somewhat more feeds on hand at the end of the year than at the beginning. As a result, inventories showed a net increase of about $2,600 per farm:

Items	Change
Land & buildings	$ +676
Livestock	+1,006
Power & machinery	+815
Feeds & supplies	+111
Total	$+2,608

Farm receipts. Milk sales averaged $12,873 per farm. The average price received for milk, on a 3.7 percent butterfat basis, was $4.64 per 100 pounds. Cattle and other livestock sales were about $1,580, and crops $180. Miscellaneous receipts, including those ACP payments of $82, amounted to a little more than $600. Income from all of these sources totalled $15,300:

Items	Per farm
Milk	$12,873
Other L. S. products	60
Livestock	1,581
Crops	183
Miscellaneous	603
Total	$15,300

Labor income. From the foregoing figures, several answers with respect to net income can be calculated.

Total operating receipts of $15,300, minus total operating expenses of $9,559 gives a net operating balance of $5,741. Omitted are capital transactions, interest on capital and family labor. Such a measure of net income has only limited usefulness.

Total operating receipts of $15,300 minus total operating expenses and capital outlays combined of $12,777 equals $2,523 - a measure of cash balance for the year. It is simply the difference between what was taken in and what was spent, assuming no change in debts. Interest payments are not taken into account, however.

It is obvious that not all of the capital outlays should be charged against current operations. The excess over depreciation should be handled as an increase in inventory. This was done.

To get a complete picture in terms of what the farm business returned to the operator for his year's work and management, the figures were summarized in terms of "labor income".

To the total operating receipts was added the increase in inventories. To

the operating expenses were added the capital outlays and allowance for family labor:

Items	Per farm
Operating receipts	$15,300
Inventory increase	2,608
Total receipts	$17,908
Operating expenses	$ 9,559
Power & machinery bought	2,573
New buildings	645
Family labor, exc. operator	634
Total expenses	$13,411
Farm income	$ 4,497
Interest @ 5 percent	2,287
Farm labor income	$ 2,210
Labor income per operator	$ 1,950

The difference between these two group totals, amounted to nearly $4,500 per farm. This is called farm income. From the farm income, interest at 5 percent on the total capital was deducted, not just interest actually paid. This interest charge amounted to $2,287, and when subtracted from farm income, gave a farm labor income of $2,210. The labor incomes on farms operated as partnerships were reported as labor income per operator.

The average labor income per operator of the 223 farms amounted to $1,950, or about $160 per month. As the measure of financial success in this study it will be used to compare individual farms and groups of farms. All reference to labor income in this study from here on means labor income per operator. If comparisons are to be made with incomes of non-farm groups, the value of the living, including dwelling, obtained from the farm should be added. Thus, the average labor earnings in this region were $2,750:

Items	Per farm
Labor income	$1,950
Living from farm(est.)	800
Labor earnings	$2,750

None of these measures necessarily shows the amount of income available for living and saving on individual farms, however, because of differences in (1) amount of indebtedness, and (2) other income of the family.

Income comparisons. Average hired men's wages per month with house in this region were reported in letter number 4 to be $194 per month. Thus, the average labor income of these dairy farmers of $1,920, or $160 per month, does not compare favorably with going hired men's wages. Over a long period of years in New York farming, average incomes of farmers have about equalled hired men's wages, although there have been wide differences in some years.

For a selected group of 542 dairy farms located mostly in central New York, those in the extension service farm account projects, the average labor income was $3,490 for 1959, as compared with the $1,950 for the random sample of farms reported in this study.

Another comparison of interest is with incomes of commercial dairy farms in other regions. All incomes are based on random samples of farms, but the figures are for different years. The crop seasons were about normal, and economic conditions were similar,

except for higher crop prices in 1953-54 and lower milk prices in 1955-56 than in other years.

Oneida-Mohawk farm incomes averaged higher than those in the North Country and of hill farms in the Plateau region. They were lower than those in the Central Plain and of valley farms in the Plateau region:

Region	Year	Labor income
Oneida-Mohawk	1959-60	$1,950
Plateau		
Hill	1957-58	1,700
Valley	1957-58	2,660
North Country	1955-56	890
Central Plain	1953-54	3,140

Differences in land resources and market conditions as they are reflected in how the farms are organized and operated, together with some variation in prices, largely account for these different levels of incomes.

Average incomes by size of herd. Even more meaningful than the average labor income of the cross-section of farms in the region are the labor incomes of the groups of farms with different sized herds. Remember that the farms in three of these groups are random samples. Also, the group of farms with 60 or more cows represents practically complete coverage.

Farms with small herds, those with 6 to 19 cows, had total capital of about $24,000 per farm. The difference between total farm receipts and total farm expenses was somewhat less than $1,500. Labor incomes averaged only $260. Some 17 percent of the farms in the region are in this size-of-herd category. Such an inadequate level of incomes is forcing many operators in this situation to quit or seek off-farm jobs. Other farmers in this group are retiring.

Total capital per farm on the 20 to 39 cow farms reached nearly $40,000, and labor incomes averaged $1,370. Remember that 55 percent of the farms fall in this size-of-herd group. Even with living from the farm taken into account, this level of incomes falls short of most accepted standards:

Items	Number of cows per farm			
	6 to 19	20 to 39	40 to 59	60 or more
Total capital	$24,106	$39,339	$60,834	$104,342
Total farm receipts	$ 7,045	$14,512	$25,173	$ 44,286
Total farm expenses	5,577	11,007	18,518	32,507
Farm income	$ 1,468	$ 3,505	$ 6,655	$ 11,779
Interest on capital	1,205	1,967	3,041	5,217
Labor income per farm	$ 263	$ 1,538	$ 3,614	$ 6,562
Labor income per operator	$ 263	$ 1,370	$ 3,170	$ 4,920

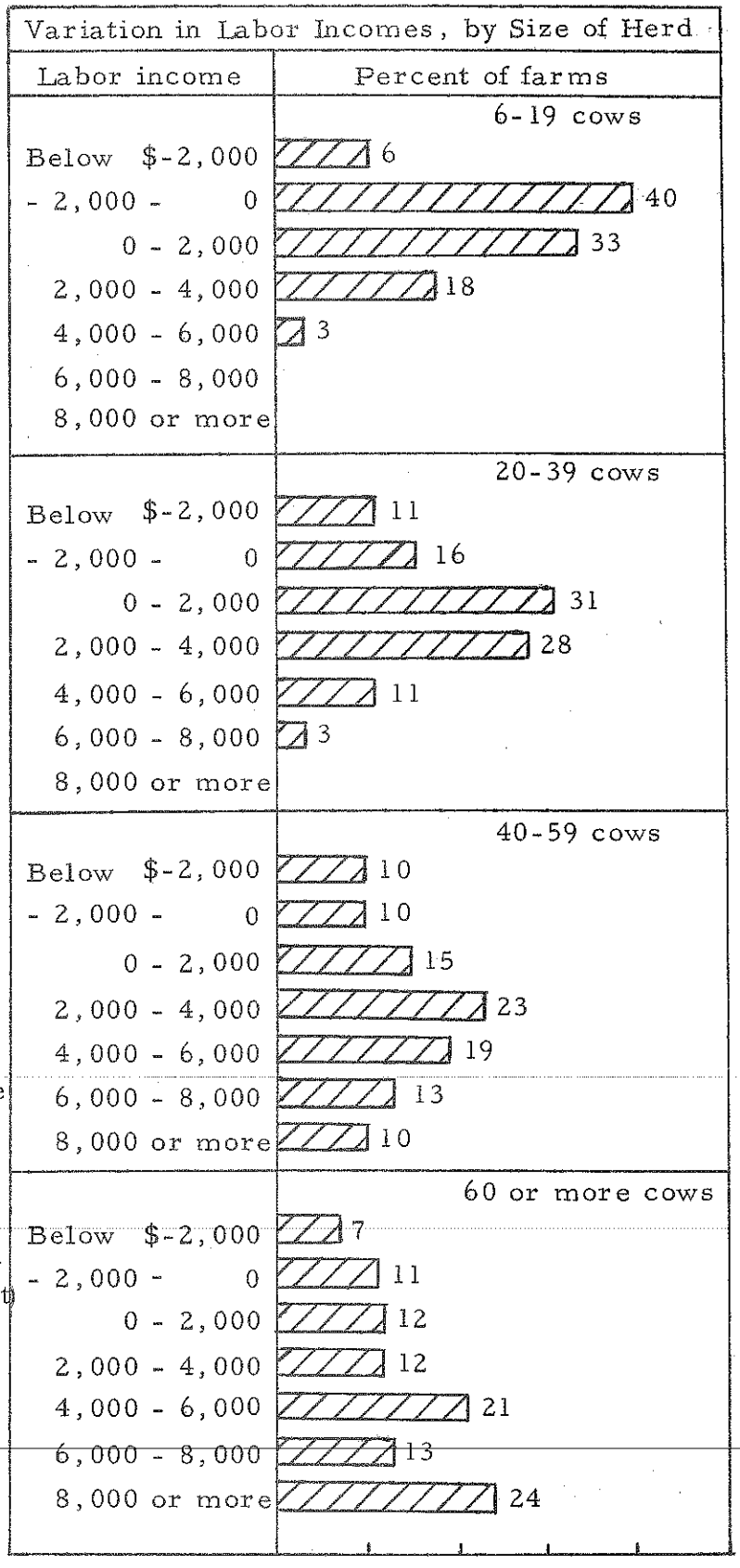
More than $60,000 of total capital was reported on the 40-59 cow farms. Labor income rose to nearly $3,200. It is only where this size of operation is reached that the income level compares favorably with that of urban workers.

With the most capital per farm, in excess of $100,000, nearly $5,000 of labor income was made on the farms with 60 or more cows, averaging 75. The comparatively good income level of this group of farms lends encouragement for the future in dairying.

The remarkable fact is that both of these latter groups of farm operators have done so well in light of worsening price-cost relationships in dairying. Their efforts to enlarge size, adopt new production practices, and control costs have paid off.

Variation in incomes. Incomes of most industrial workers are fairly uniform from worker to worker, because of similar hourly rates and hours worked. In sharp contrast, incomes of individual dairymen were found in this study to vary widely. These income differences occurred even within the groups of farms with broadly similar size of herds. The larger the herd, however, the greater the variation in incomes (see chart).

Among the farms with 6 to 19 cows, nearly one-half of them (46 percent) failed to make a plus labor income, although losses were small on most of them. That is, these farms did not have enough income to meet farm expenses and interest



on invested capital, let alone any return for the operators' labor. One-third of this group of small farms had incomes within the range of zero to $2,000, and nearly one-fifth of them made from $2,000 to $4,000. But only one farm (3 percent in the sample) made as much as $4,000. This is a highly productive farm which had a large gain in the cattle account from heifers freshened and had milk sales of 10,770 pounds per cow.

Similarly, among the farms with 20 to 39 cows, 11 percent incurred large losses and another 16 percent failed to make any return for operator labor. Others fared better. Nearly 60 percent made up to $4,000, and 14 percent did make $4,000 or more. Of these, a few (3 percent) realized at least $6,000, but none made as high as $8,000.

The percentage of farms with losses was somewhat lower among the farms with large herds than among those with small herds. With 40 to 59 cows, 20 percent of the farms had losses, 13 percent were in the income range of $6,000 to $8,000 and 10 percent made $8,000 or more. Minus incomes were found on 18 percent of the farms with the largest herds (60 or more cows). The others did better, some much better. Twenty-four percent (nearly one in 4) of these large farms made at least $8,000. In fact, incomes on a few of these large farms exceeded $15,000.

Using labor income as the comparable measure of financial success, are not these wide differences in incomes amazing? As has been shown, the farms are all of the same type-dairy; are all located in the same region; all received similar prices for milk, and the records are all for the same crop year.

The major reasons for these differences in incomes are to be found in how the farms were run. The job ahead in this study is to analyze these reasons and in so doing to resolve them into guides to successful farming in the future. These are the subjects for discussion in the letters to follow in this series.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

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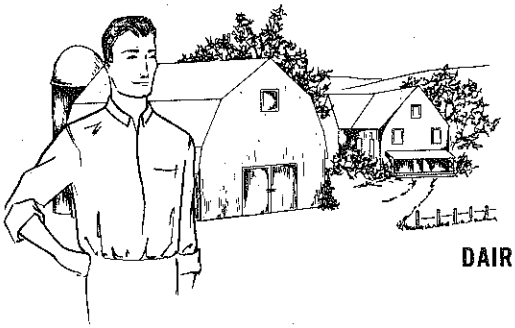

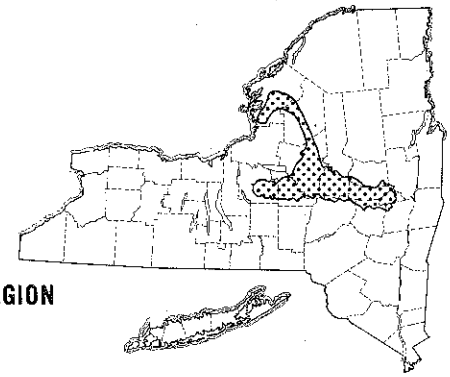

DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 8

August 29, 1961

To Farmers Visited on
Farm Management Survey:

The end inventory of farm property on the farms surveyed showed an increase over the beginning inventory of about $2,600 per farm. Yet the average labor income was only $2,210 per farm or $1,950 per operator. How can one reconcile these figures? Also, one farmer's wife observed "the labor income for our farm looks good, but we never seem to have any money". What is the explanation? How much financial progress did these farm families make?

Estimated Debts $10,000 per Farm

Figures on farm receipts, expenses and inventories were collected from farmers for this study, but no information about debts, family living expenses, or family outside income was obtained. The following estimates for the average of the 223 survey farms were made:

a. Amount of debts at the beginning of the year $10,000 per farm, based on USDA reports of total indebtedness of farmers in the state.

b. Ten percent of the principal repaid during the year.

c. Interest rate 6 percent.

d. Family out-of-pocket living expenses $3,000 for the year. Since 7 percent of the farms were operated as partnerships, this figure amounts to $3,210 per farm.

e. Family outside income of $300 per farm from off-farm investments, jobs of members of the family and similar sources. This estimate is based on fragmentary evidence.

f. Value of household goods and other personal property $5,000 per farm at both beginning and end of the year.

These estimates and the figures from the survey were used to prepare financial statements for the average of

the survey farms.

Net Income of $1,600 available for Investment

To the farm labor income were added the family labor allowance, interest on owned capital and family outside income. Family living expenses were deducted. The residual was the amount available for investment or other purposes:

Items	Per farm
Farm labor income	$2,210
Family labor allowance	634
Interest on owned capital	1,687
Family outside income	300
Total	$4,831
Family living expenses	3,210
Amount available for investment	$1,621

This amount of $1,621 from current operations accounted for part of the $2,608 increase in farm property. The balance came from increased borrowings.

Borrowings increased 10 Percent

Farm operating expenses and capital outlays for machinery and buildings were described in the previous letter:

Items	Per farm
Farm operating expenses	$9,559
Machinery bought	2,573
New buildings	645
Interest payments	600
Principal payments	1,000
Family living expenses	3,210
Total expenditures	$17,587

Added to those items were interest payments of $600, principal payments of $1,000 and family living expenses of $3,210. The total of all expenditures exceeded $17,500.

Next, we need to account for all the money taken in. Total operating receipts were $15,300 per farm and outside family income was $300, so new borrowings of $1,987 were necessary to finance overall operations for the year:

Items	Per farm
Total operating receipts	$15,300
Outside family income	300
New borrowings	1,987
Total receipts	$17,587

Payments on debts of $1,000 and new borrowings of $1,987 meant a net increase in debts of $987, or 10 percent, during the year. The increase reported for all farmers in the state was 9 percent. The additional debt of $987 and the $1,621 of net income over living expenses account for the $2,608 of additional property.

Increase of $1,621 in Net Worth

The statement of what was owned at the beginning of the period shows total property of $49,439, debts of $10,000, and a net worth of $39,439.

Taking into account the increase in farm property during the year of $2,608, the total property at the close of the year was $52,047. Debts increased to $10,987, leaving a net worth of $41,060. The increase in net worth during the year was $1,621:

Items	Average per farm			Your farm		
	Beginning	End	Change	Beginning	End	Change
Farm property	$44,439	$47,047	$+2,608			
Personal property	5,000	5,000	0			
Total property	$42,439	$52,047	$+2,608			
Debts	$10,000	$10,987	$ +987			
Net worth	$39,439	$41,060	$+1,621			

These figures represent, of course, averages for a random sample of commercial farms in the region. Individual farm situations varied from this average picture. Why not fill in the figures for your situation in the space provided.

The increase in net worth was represented not as money on hand or in the bank but as more farm property. This is why the farmer's wife found cash to be scarce. The business was expanded faster than net earnings were accumulated. The explanations for the increase in property being large in relation to the labor income were that (a) most of the capital was owned, so only a part of the interest charge used in calculating labor income was actually paid and (b) some of the funds used to finance the increase were borrowed.

Conclusions

1. As a group, dairy farmers have large equities (80 percent) in their businesses, but wide differences exist from farm to farm.

2. Apparently farmers were able to get ahead financially (averaging about $1,600 per farm) during 1959-60, the period under study. But again, financial progress varied widely among farms.

3. Farmers expanded their operations faster than earnings permitted, so debts were increased. In this study, expansion was financed about 60-40 out of earnings and borrowings.

4. The financial progress of a farm family depends on:
   a) labor income
   b) equity in the business
   c) other family income, and
   d) family living expenses.

The most important of these is labor income. The analysis in this study deals with the farm business factors that affect labor income.

Yours truly,

L. C. Cunningham

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Extension Economist

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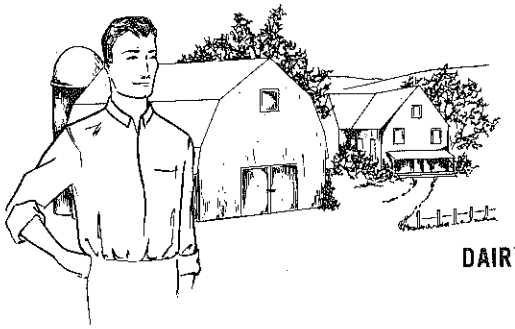
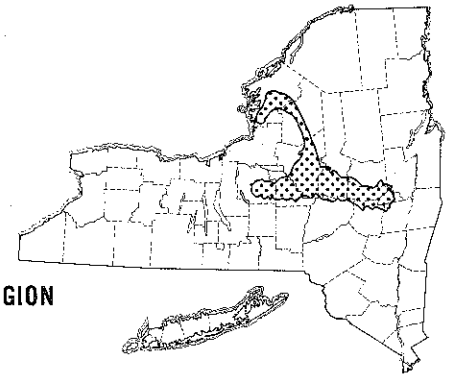




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 9

September 27, 1961

To Farmers Visited on
Farm Management Survey:

The relation of crop yields to income and the effect of some farming practices on yields are described in this letter.

Size of herd is a major factor in determining labor income, as was shown in letter number 7. Therefore, the analysis of other factors including crop yields to income is based on three size-of-herd groups of farms:

Number of cows per farm	Number of farms
20 to 39	217
40 to 59	276
60 to 99	207

The number of records in each of these groups is large enough to permit sorting to study relationships. In these letters, the data for particular size groups are presented to show the facts, although the analysis covers all three groups.

Crop Yields

On dairy farms where the crops are used mostly for feed, as in this region, crop yields are related to income through their effect on the feed supply and in turn on the number of cattle kept and the rate of milk flow per cow. Crop yields are also related to crop expense, power and machinery expense and feed bought.

The per-acre yields of the major crops of each farm were expressed as a percentage of the average yields of the region. This percentage figure for each farm is called "crop yield index". A crop yield index of 130 for a particular farm means that the combined per-acre yields on that farm were 30 percent above average.

Relation to roughage per cow. Crop yields were closely related to the intensity of stocking of the cropland with cattle. Farms with high crop yields in each size of herd group had as many cows as farms with low yields, but the cows were kept on fewer acres of cropland. That is, farms with high crop yields were much more intensively stocked than were farms with low yields. For example, in the group of farms

with 40 to 59 cows, as the crop yield index rose from less than 70 to 130 or more, the average number of cows per farm was about unchanged at 48, but the average acres of crops per farm declined from 182 to 106. The acres of crops per cow went down from 3.8 to 2.2.

Despite the reduced amount of cropland per cow, high crop yields produced more roughage per cow than did low yields. With low yields only 4.4 tons of roughage was harvested per cow, whereas with high yields the harvest was 6.2 tons per cow in the group of 40 to 59 cow farms:

Crop yield index range	Crop acres per cow	Tons H.E. harvested per cow
Less than 70	3.8	4.4
70 to 89	3.2	5.0
90 to 109	2.9	5.4
110 to 129	2.4	5.8
130 or more	2.2	6.2

Relation to milk per cow. Milk per cow increased significantly as crop yields went up, because of the additional roughage made available. With a crop yield index less than 70, on the farms of 40 to 59 cows, averaging 48, milk sales averaged just under 8,000 pounds per cow. But with an index 130 or more the average was about 9,600 pounds per cow:

Crop yield index range	Cows per farm	Lbs. milk sold per cow
Less than 70	48	7,980
70 to 89	48	8,180
90 to 109	48	8,240
110 to 129	48	8,920
130 or more	47	9,620

Relation to selected expense groups. As would be expected, the expense for seed, fertilizer and lime per crop acre went up as crop yields increased. But power and machinery expense per cow showed no consistent relation to yields. The additional milk per cow associated with high yields, mentioned above, was obtained without additional feed bought per cow. To illustrate, as the crop yield index rose from less than 70 to 130 or more, crop expense per crop acre increased from $5 to $11, but expenses per cow for power and machinery and for feed bought remained about unchanged on the farms with 40 to 59 cows:

Crop yield index range	Crop exp. per crop acre	P & M expense per cow	Feed bought per cow
Less than 70	$ 5	$117	$95
70 to 89	7	112	86
90 to 109	9	124	86
110 to 129	9	119	92
130 or more	11	118	92

Relation to income. Incomes rose as crop yields increased in all three size-of-herd groups. The relationship on the 40 to 59 cow farms was representative:

Crop yield index range	Number of farms	Average labor income
Less than 70	31	$1,630
70 to 89	52	2,660
90 to 109	74	2,380
110 to 129	60	3,820
130 or more	59	5,200

The 31 farms of this group with crop yields 30 percent or more below average made an average labor income of only about $1,600, whereas the 59

farms with yields 30 percent or more above average made in excess of $5,000.

Soils related to Crop Yields

It was pointed out in letter number 2 that crop yields, particularly of hay, were higher in the area of well-drained, high-lime soils than in the area of somewhat poorly drained, acid soils. But in all four soil areas, there were differences in yields on individual farms. Some practices were found to be directly related to variations in yields.

Practices related to Crop Yields

High crop yields were the result of many farming practices. Among those affecting amounts of plant food which could be analyzed in this study were crop expense, intensity of stocking and the amount of plant food available from manure and commercial fertilizer.

Crop expense per crop acre. Outlays for seeds, fertilizer, lime and weed sprays were grouped as crop expense. In general, crop yields rose as the amount of crop expense per crop acre increased. Labor income also increased, indicating that the practices for which the money was spent were profitable. The average expenditures in the highest groups was $20 per crop acre. The relationship found on the 60 to 99 cow farms was as follows:

Crop expense per crop acre		Crop yield index	Average labor income
Range	Average		
Less than $5	$ 3	103	$3,380
5 to 9	7	109	4,060
10 to 14	12	118	5,700
15 or more	20	124	5,830

Intensity of stocking. The farms that were stocked the heaviest with cattle in relation to the cropland had the highest crop yields, because of the additional plant food from manure. In the group of farms with 40 to 59 cows, for example, those farms that were lightly stocked, 4.0 or more crop acres per cow, had an average crop yield index of only 81. In contrast, farms that were heavily stocked, less than 2.0 crop acres per cow, had an index of 125. A similar relationship was found in the other size groups of farms. The more intensively the farms were stocked, the higher the crop yields and the larger the average labor income:

Crop acres per cow		Crop yield index	Average labor income
Range	Average		
Less than 2.0	1.6	125	$4,390
2.0 to 2.9	2.4	112	3,200
3.0 to 3.9	3.4	94	2,840
4.0 or more	4.9	81	2,540

Additional cropland per cow did provide more roughage per cow, but milk per cow did not increase because less feed was bought, and perhaps because the hay produced was of lower quality. Also, as the amount of cropland per cow increased, power and machinery expense per cow went up markedly.

Manure and commercial fertilizer. The rate of stocking the cropland with cattle influenced crop yields through the amount of manure produced. The amount of plant food available from stable manure produced on each farm was calculated. It was assumed that 8 tons of manure was produced, other than that on pasture, per cow or other animal unit, and that a ton of manure

contained 10 pounds of nitrogen, 5 pounds of phosphoric acid, and 10 pounds of potash. The actual amount of plant food available for the crops depended on how the manure was handled. The common practice on most farms was to spread the manure daily. For the few who did not follow this practice, the calculation overstates the actual situation. On the 20 to 39 cow farms, for example, 350 tons of stable manure was produced per farm. This amounted to 3.9 tons of manure containing 98 pounds of plant food available per crop acre.

Practically all of the dairymen used some commercial fertilizer on their 1959 crops. On the 20 to 39 cow farms, the application amounted to the equivalent of 100 pounds of 10-10-10 mixed fertilizer, or 30 pounds of plant food, per crop acre. For all three size-of-herd groups, manure was much more important than commercial fertilizer as a source of plant food. Also, farms with large herds had somewhat more plant food per crop acre from both sources than did farms with small herds:

Source	Cows per farm		
	20-39	40-59	60-99
	Lbs. of plant food		
Manure	98	104	106
Com. fertilizer	30	37	46
Total	128	141	152

The plant food available from manure and commercial fertilizer combined had a strong influence on crop yields. As the amount per crop acre increased, crop yields as measured by the index rose strikingly, especially up to 150 pounds per acre (see chart, page 5).

It paid well to provide the additional plant food. This is shown by the figures for the group of farms with 40 to 59 cows. On farms with limited plant food, 0 to 99 pounds per crop acre, the crop yield index was only 79 and the average labor income was about $2,500. With liberal plant food, at least 200 pounds, the yield index was 132 and the average income exceeded $4,600:

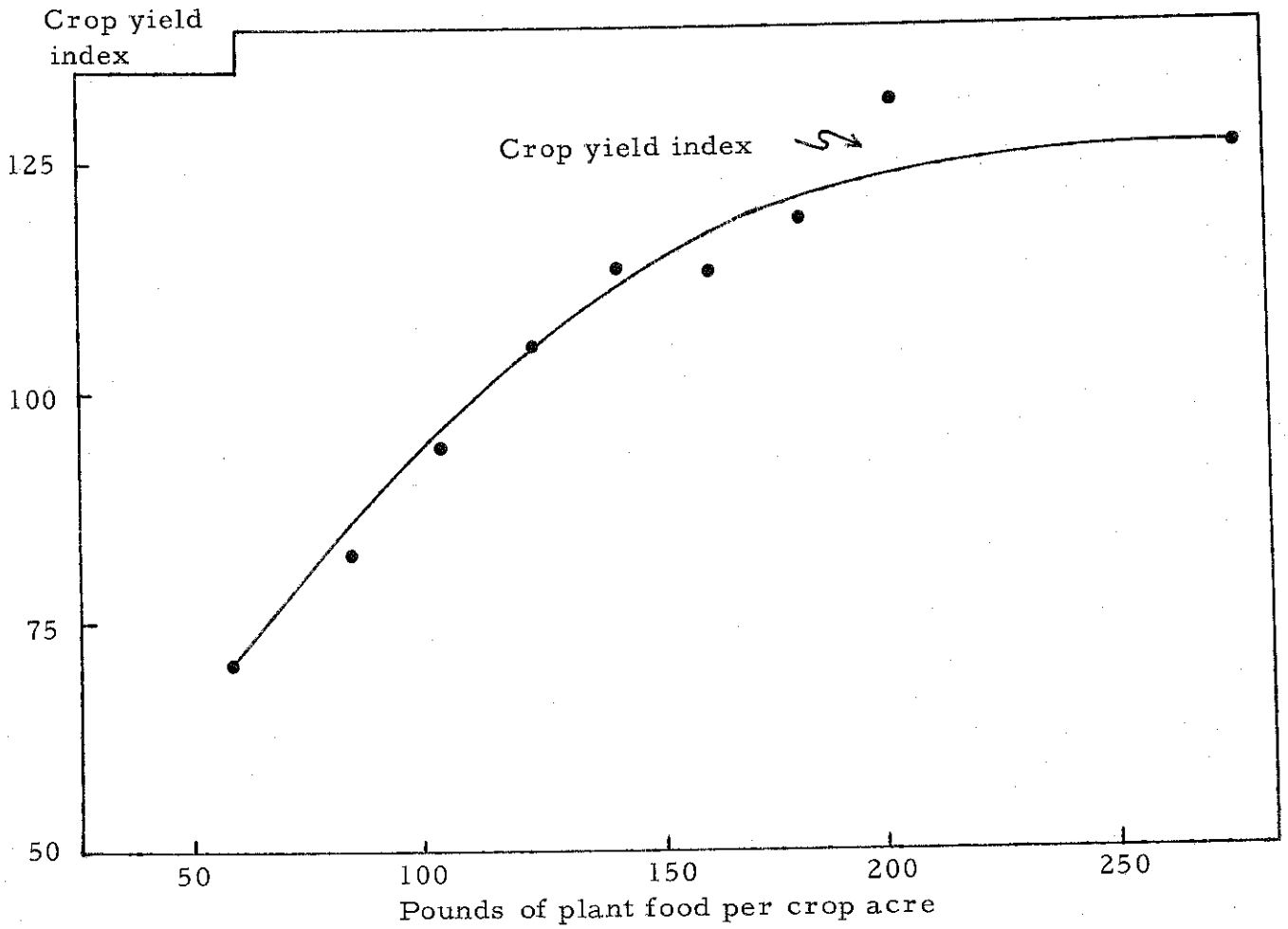
Pounds of plant food per crop acre		Crop yield index	Average labor income
Range	Average		
0 to 99	75	79	$2,530
100 to 149	120	103	2,670
150 to 199	168	116	4,020
200 or more	235	132	4,630

To supply additional plant food was an outstanding practice to improve crop yields. This was done by heavy stocking of the cropland (about 2 acres per cow) and the application of the equivalent of 250 to 300 pounds of commercial fertilizer per crop acre. That is, a 50-cow farm would have about 100 acres of crops to which would be applied 12 to 15 tons of fertilizer. This combination of practices should provide the desired roughage supply of 6 tons of hay equivalent harvested per cow.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist



RELATION OF PLANT FOOD PER CROP ACRE TO CROP YIELDS
762 dairy farms, Oneida-Mohawk region, New York, 1959-60

Crop yields were directly related to available plant food. The response in yields to additional amounts of plant food was striking, particularly at the low and intermediate levels.

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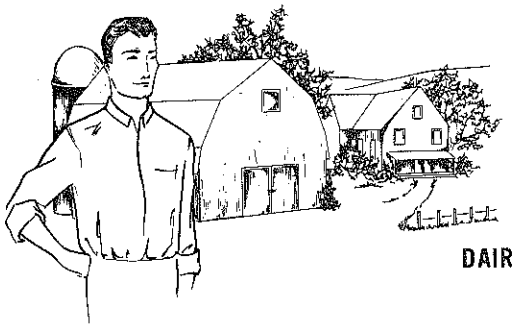
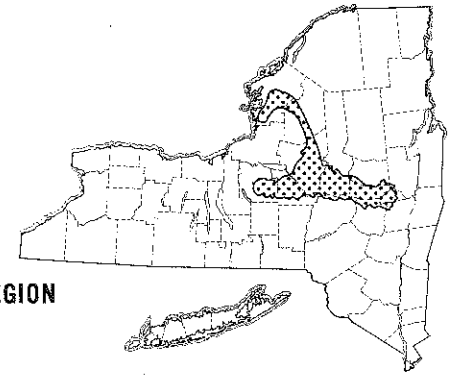




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 10

October 31, 1961

To Farmers Visited on
Farm Management Survey:

The amount of milk per cow varied widely from farm to farm and accounted for a great deal of the variation in labor incomes of the farms in this study. In this letter is shown the relation of this important factor to crop yields, use of labor and selected expense groups, and to labor income. Also shown is the relationship of some farming practices to milk per cow.

As with crop yields, the analysis of milk per cow is based on either the three size-of-herd groups of farms, or on all farms. Presented in some sections of this letter to show the facts, however, are data for only particular size-of-herd groups.

Milk Sold per Cow

You will recall that we are dealing with the amount of milk sold per cow, not the amount produced. The total pounds of milk delivered to the plant, converted from actual butterfat test to 3.7 percent, was divided by the average number of milk cows in the herd.

Relation to crop yields, labor and machines. Milk sold per cow and per-acre yields of crops were interrelated, as was shown in the previous letter. The records of each size-of-herd group were sorted on milk per cow and crop yields were tabulated. As milk per cow rose, crop yields went up fairly consistently in the medium and large sized herd groups, but less so in the small herd group.

The number of cows cared for per man was about as high on farms with high milk production per cow as on farms with low production, except in the 60 to 99 cow group where the number was somewhat fewer. But power and machinery expense per cow increased as milk per cow rose. Generally, the farms with good cows were more fully mechanized than were the farms with poor cows. On farms with 40 to 59 cows, as milk per cow rose from less than 6,000 pounds to 11,000 pounds or more, the number of cows per man declined from 23 to only 21 but power and machinery expense per cow jumped from $100 to $135:

Pounds of milk sold per cow	Cows per man	P. & M. expense per cow
Less than 6,000	23	$100
6,000 to 7,000	25	114
7,000 to 8,000	23	108
8,000 to 9,000	23	119
9,000 to 10,000	23	121
10,000 to 11,000	21	127
11,000 or more	21	135

Livestock expense, including veterinary fees and medicines, breeding fees, milk testing, dairy supplies and miscellaneous items, averaged about twice as much per cow on farms with high-producing cows as on those with low-producing herds.

Relation to income. How well on the average did high-producing herds pay? What were the odds of making a $5,000 labor income with such cows? As any experienced dairyman would know, the relationship of milk sales per cow to labor income was indeed striking.

Take the figures for the 40 to 59 cow group to illustrate the point. The 21 farms with less than 6,000 pounds of milk sold per cow incurred a serious loss on the average - a minus labor income of $1,760:

Pounds of milk sold per cow	Number of farms	Average labor income
Less than 6,000	21	$-1,760
6,000 to 7,000	29	220
7,000 to 8,000	50	1,910
8,000 to 9,000	56	3,500
9,000 to 10,000	52	4,020
10,000 to 11,000	37	5,450
11,000 or more	31	7,400

One-half of these farms had losses of at least $1,000 and none made as much as $5,000. As milk per cow went up, average incomes rose. The 31 farms with 11,000 pounds or more of milk per cow made an average labor income of $7,400. Only one farm in this group had a loss - the loss was small - and four out of five of the farms made $5,000 or better.

A 1,000-pound increase in milk per cow raised the average labor income about $700 on the small farms, $1,500 on the medium-size farms and $1,800 on the large farms.

Practices Related to Milk per Cow

Of the many farming practices that bear on the rate of milk production per cow, season of production, herd turnover, roughage harvested and feed bought could be analyzed in this study.

Season of milk production. The higher the percentage of winter milk production, generally speaking, the larger the amount of milk sold per cow and per man, the higher the price received for milk, and the larger the income:

Percent of milk sold Oct.-Mar.		Pounds of milk sold per cow	Average labor income
Range	Average		
Less than 40	36	7,300	$ 40
40 to 44	42	7,800	2,010
45 to 49	47	8,590	3,320
50 to 54	52	9,440	4,530
55 or more	58	8,890	4,060

On specialized dairy farms, such as these, year-round milk production is of particular importance in the efficient use of labor. The figures for the

farms with 40 to 59 cows show that about 50 percent of the milk produced in the 6 months October to March was optimum.

Percent of cows removed. To figure this percentage, the number of cows sold, eaten or died during the year was divided by the number of cows at the beginning of the year. In each size of herd group, milk per cow was lowest in the herds with the slowest turnover of cows. In the 20 to 39 and 40 to 59 cow groups, production was highest in the herds with 30 percent or more of the cows removed. In the 60 to 99 cow group, it was highest in the herds with turnover in the range of 20 to 29 percent. Generally speaking, however, labor incomes were highest where culling was held within the range of 10 to 19 percent. Incomes were lowest where turnover was at either extreme. The figures for the 40 to 59 cow farms show the typical relationship:

Percent of cows removed		Pounds of milk sold per cow	Average labor income
Range	Average		
0 to 9	6	7,600	$2,010
10 to 19	15	8,700	3,880
20 to 29	24	8,840	3,280
30 or more	37	9,010	2,540

The figures for this same size group of farms show that not only was somewhat more money spent on veterinary bills and similar items of livestock expense, but that the loss on cows mounted rapidly as the percentage of cows removed went up.

Loss on cows was calculated by subtracting the total of end inventory value plus value of cows removed from the beginning inventory value plus the value of cows bought and heifers freshened:

Percent of cows removed		Livestock expense per farm	Loss on cows per farm
Range	Average		
0 to 9	6	$505	$ 386
10 to 19	15	654	1,042
20 to 29	24	672	1,581
30 or more	37	695	2,611

Amount of roughage. The amount of hay equivalent harvested per cow taken by itself showed only a limited relation to milk yield per cow in all three size groups. This was largely because of other influences which will be discussed later.

Kind of roughage. All 762 records were sorted according to the kind of roughage harvested. On 91 farms where hay was the sole roughage, the hay harvest averaged only 5.0 tons per cow and milk sold only 7,780 pounds per cow; 25 farms with hay and grass silage did better, and 465 farms with hay and corn silage did still better. But the best average performance was on 181 farms with all three roughages - hay, grass silage and corn silage:

Kind of roughage	Tons H.E. harvested per cow	Pounds of milk sold per cow
Hay	5.0	7,780
Hay, grass silage	5.2	8,240
Hay, corn silage	5.6	8,580
Hay, grass silage, corn silage	5.8	8,830

Using the one size-of-herd group, 40 to 59 cows, where herd size is relatively constant and numbers of farms are sufficient, a similar increase in

milk per cow is shown, as is also the advantage in labor income for the farms having the combination of all three roughages:

Kind of roughage	Pounds of milk sold per cow	Average labor income
Hay	8,080	$2,300
Hay, corn silage	8,580	3,200
Hay, grass silage, corn silage	9,070	3,820

Date of hay harvest. These dairymen's experiences check with experimental results which show that more milk is produced with early cut hay than with late cut.

In all three size groups, as the percentage of first-cutting hay harvested by June 30 increased, milk per cow rose. The single exception was the sub group of farms with 90 to 100 percent of the crop cut by June 30 in the 20 to 39 cow size group. Hay equivalent harvested per cow and the amount of feed bought per cow showed irregular trends. The relationship on the 40 to 59 cow farms was representative. With no hay harvested by June 30, milk sales averaged only about 7,700 pounds per cow, but with the hay harvest nearly completed by that date, milk sales exceeded 9,200 pounds per cow:

Percent hay harvested by June 30	Tons H. E. harvested per cow	Pounds of milk sold per cow
Zero	4.9	7,720
1 to 49	5.4	8,430
50 to 89	5.8	8,940
90 to 100	5.5	9,270

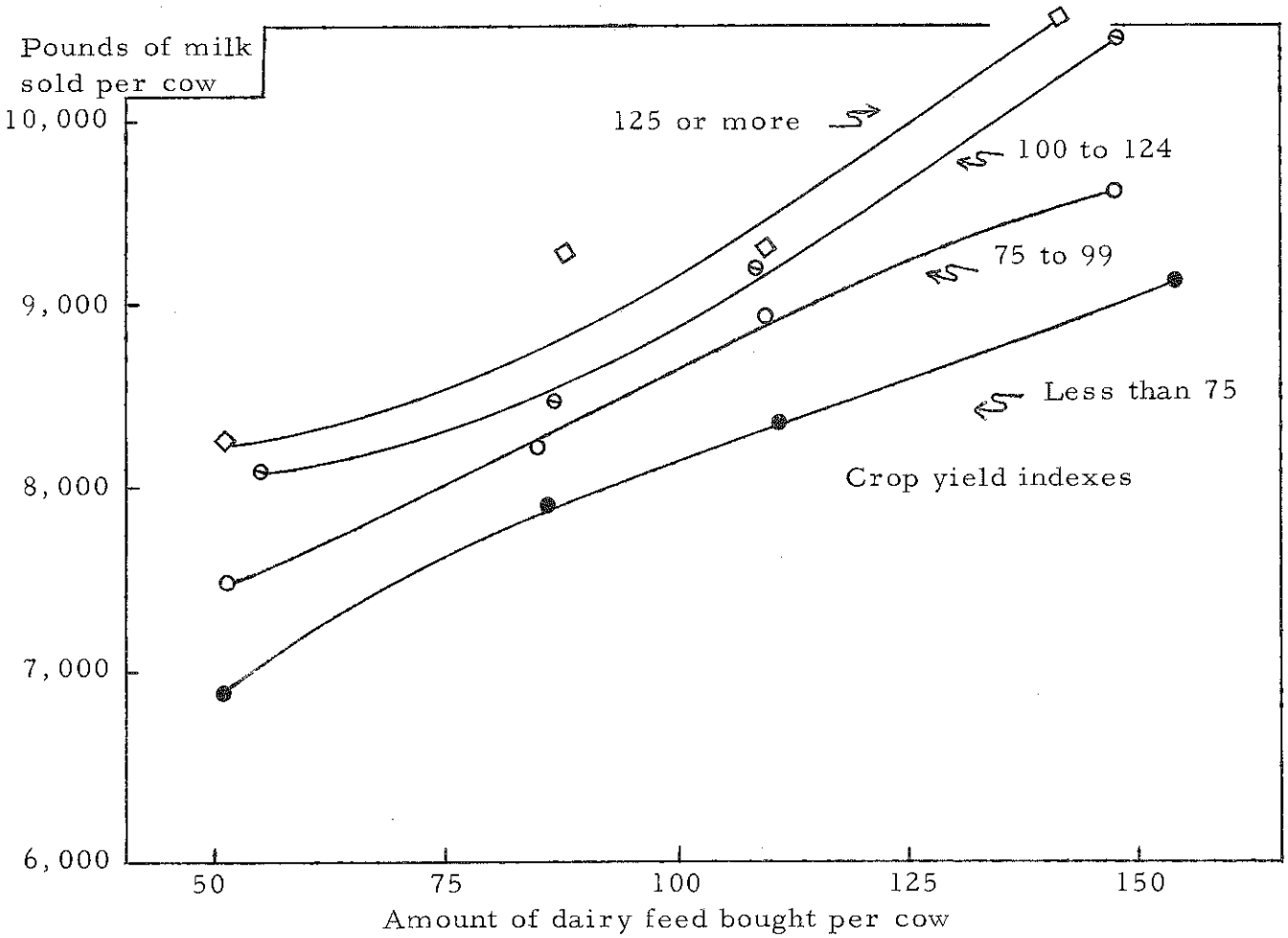
Feed bought per cow. The total dairy feed bought, including roughage if any, was divided by the average number of cows in the herd to calculate this expense item. The amount of dairy feed bought per cow was closely related to the amount of milk sold per cow. However, average labor incomes indicated that additional feed bought, of itself, did not pay. Take the large farms, 60 to 99 cows, for example. As feed bought per cow ranged from less than $50 on some farms to $125 or more on others, milk per cow rose from 7,370 pounds to 10,430 pounds, but labor incomes did not go up:

Feed bought per cow	Pounds of milk sold per cow	Average labor income
Less than $50	7,370	$4,000
50 to 74	8,600	4,850
75 to 99	8,660	4,725
100 to 124	9,590	5,090
125 or more	10,430	4,720

Feed bought per cow and crop yields. Additional roughage obtained from high crop yields gave a greater response in milk per cow than that from a large crop area per cow. The combination of feed bought and roughage from high yields had a pronounced effect on milk production per cow. The facts are shown by a "double sort" of all 762 records, first sorted by crop yield index into four groups and the records in each of these groups sorted by amount of feed bought per cow.

With low crop yields and low feed bought per cow, milk sales averaged only about 6,900 pounds per cow. At each level of crop yields, as more feed was bought, milk per cow went up (see chart on next page).

The combination of high crop yields and large amount of feed bought per cow



Relation of Amount of Feed Bought per Cow to Milk Sold per Cow, With Different Levels of Crop Yields

resulted in average milk output of 10,600 pounds per cow:

Feed bought per cow	Crop yield index: Under 75	75 to 99	100 to 124	125 or more
	Pounds of milk per cow			
Under $75	6,880	7,510	8,080	8,170
75 to 99	7,870	8,240	8,480	9,340
100 to 124	8,360	8,940	9,250	9,380
125 or more	9,170	9,620	10,460	10,600

Notwithstanding the strong response in milk per cow from added amounts of feed bought per cow, this practice did not raise profits, except in the group of farms with high crop yields. With low yields, labor income rose as feed bought increased up to $125 per cow, but then income fell back. With the crop yield index in the range of 75 to 99, incomes were about unchanged as feed purchases rose. Again, with the crop yield index in the range of 100 to 124, labor incomes fluctuated irregularly but did not rise. Only in the group with high crop yields, index of 125 or more, did average

incomes tend to improve with increases in feed bought. Here, unfortunately, the increase in income was irregular because of differences in size of herd. The group of farms with a crop yield index of 125 or more and feed bought of $75 to $99 made an average labor income of nearly $5,800. However, the group with similar high yields and still more feed bought, $125 or more per cow, was the most successful with an average income of nearly $6,200:

Feed bought per cow	Crop yield index			
	Under 75	75 to 99	100 to 124	125 or more
	Labor income			
Under $75	$ 880	$2,470	$4,180	$4,310
75 to 99	1,290	2,620	2,580	5,760
100 to 124	2,010	2,330	3,620	4,430
125 or more	900	2,350	3,820	6,170

We can look at the above income figures in another way. At each level of feed bought per cow, average labor incomes rose markedly and fairly consistently as crop yields improved, because the high yields meant more feed. That is, both additional home-grown feed and purchased feed produced more milk. It was most profitable, however, to buy additional feed where high crop yields were obtained.

Summary of practices. These practices gave the highest response in milk per cow and, generally speaking, were the most profitable:

1. Produce about 50 percent of the year's total milk in the 6 months October to March.

2. Hold the turnover of cows in the herd within the limits of 10 to 20 percent for the year.

3. Provide the combination of three roughages - hay, grass silage and corn silage.

4. Complete the first-cutting hay harvest at least by the end of June.

5. Combine a liberal amount of roughage (6 to 7 tons of hay equivalent per cow) obtained from high crop yields with moderately heavy purchase of feed ($125 to $150 per cow, based on prices in the period of this study).

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

COOPERATIVE EXTENSION WORK IN AGRICULTURE
AND HOME ECONOMICS, STATE OF NEW YORK

N. Y. STATE COLLEGE OF AGRICULTURE
U. S. DEPARTMENT OF AGRICULTURE
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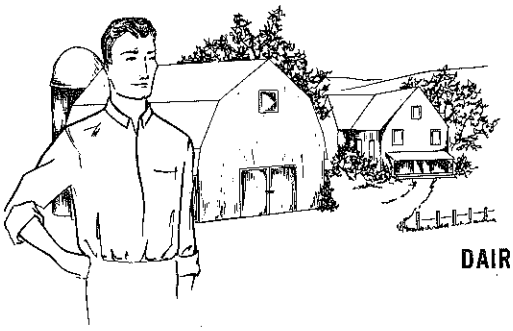
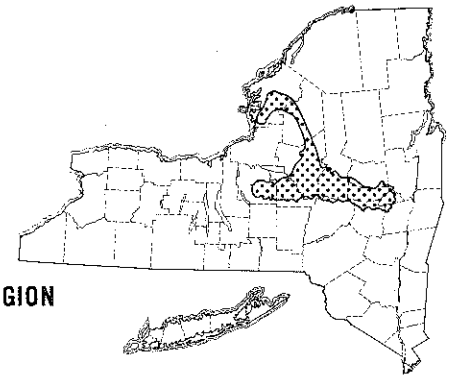




DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 11

December 22, 1961

To Farmers Visited on
Farm Management Survey:

Perhaps the most important question facing you as a dairyman is 'what size of herd?' To watch what your neighbors are doing is one guide. But much more can be learned from the systematic study of groups of farmers' experiences than from reading about some widely-publicized individual case here or there.

Special emphasis was placed on the problem of size of herd in this study of farms in the Oneida-Mohawk region. Records were obtained on a high proportion of large herds to provide substantial evidence on their operations.

Average labor incomes were shown in letter number 7 to be much higher for large herds than for small herds. Let us turn in the present letter to a further description of these size-of-herd groups and an analysis of the reasons for the differences in incomes.

Large Farms Stocked Heavier

The number of cows kept in relation to the acres of crops on these farms presented no fixed pattern. Although each dairyman may have been striving for some desired rate of stocking, the situation on many farms was partly happenstance.

The larger the herd, the larger the acreage of crops per farm, of course. But the ratio of crops to cows went down as size of herd increased. That is, the farms with large herds were stocked much heavier with cattle than were the farms with small herds. The 6 to 19 cow group had nearly 4 crop acres and the 20 to 39 cow group had 3.1 acres per cow. But the three largest size-of-herd groups all had under 3 crop acres per cow:

Cows per farm		Crop acres	Crop acres
Range	Average	per farm	per cow
6 to 19	15	58	3.9
20 to 39	29	90	3.1
40 to 59	48	134	2.8
60 to 99	71	198	2.8
100 or more	131	338	2.6

The question may be raised 'what is the most economical combination of cropland and cows?', but the answer must wait until other points have been considered.

Crop Yields Higher on Large Farms

Crop yields were higher on large farms than on small ones. This is to be expected because of the heavier stocking of the large farms. Despite higher yields, however, the amount of roughage harvested per cow was no larger on big farms than on little ones.

Small herds had an average crop yield index of only 89, or 11 percent below average. The group of herds with 60 to 99 cows had an average yield index of 113. Yet the amounts of roughage per cow in the two groups were similar, because the high yields on the large farms were offset by the reduced area of cropland per cow. The farms with 100 or more cows had yields 9 percent above average, but because of limited cropland, had a comparatively low amount of roughage per cow:

Cows per farm	Crop yield index	Tons H.E. harvested per cow
6 to 19	89	5.8
20 to 39	97	5.6
40 to 59	106	5.5
60 to 99	113	5.7
100 or more	109	5.0

Milk per Cow Also Higher

Do large herds produce less milk per cow than small herds? The answer is 'no'. The groups of herds of 40 to 59, 60 to 99, and 100 or more cows all had significantly higher milk sales per cow than did the smaller herds. It might be expected that the small herds, 6 to 19 cows, would have relatively low production per cow. But it is somewhat surprising to find that the 60 to 99 cow group had 800 pounds more milk per cow than the 20 to 39 cow group:

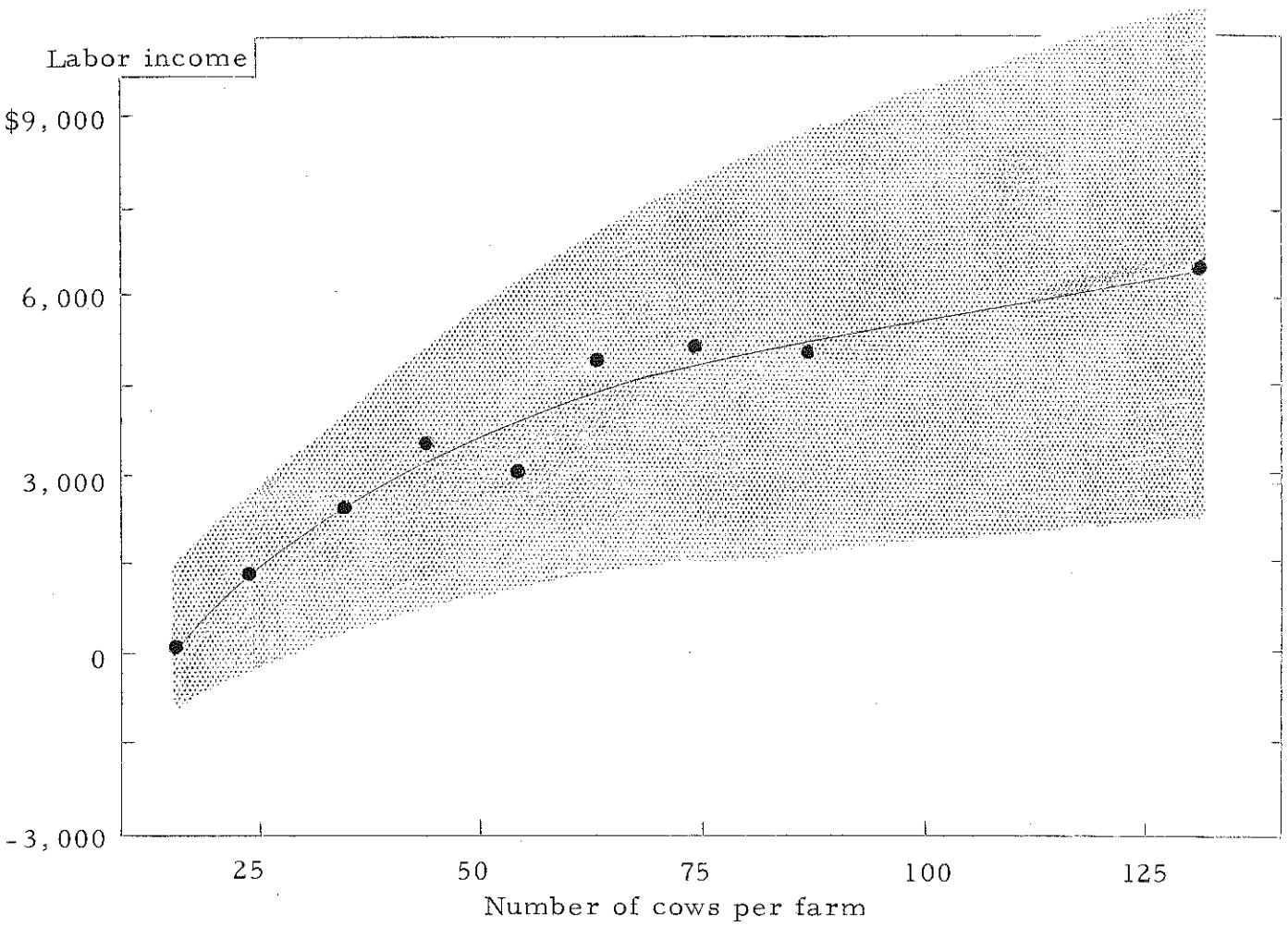
Cows per farm	Lbs. milk sold per cow	Feed bought per cow
6 to 19	7,510	$81
20 to 39	8,140	82
40 to 59	8,640	90
60 to 99	8,940	88
100 or more	8,740	81

The amount of feed bought per cow was not closely correlated with size of herd. As was just shown, the amount of roughage per cow was also unrelated to size of herd. Therefore, it appears that other practices were largely responsible for the higher rate of milk flow per cow on the large farms than on the small ones.

More Cows More Income

It was shown in letter number 7 that the 6 to 19 cow farms made an average labor income of only about $300, whereas the herds of 60 or more cows as a group returned an average income of nearly $5,000. Incomes of the other two size-of-herd groups were in between these two extremes.

This relationship of size of herd to labor income is shown graphically in the accompanying chart. The solid dots in the graph represent the average labor incomes, plotted from the ver-



RELATION OF SIZE OF HERD TO LABOR INCOME
762 dairy farms, Oneida-Mohawk region, New York, 1959-60

tical scale on the left, for the different size-of-herd groups. The scale on the bottom of the graph is for the number of cows per farm. The line drawn through the dots shows the average relationship of size to income.

In general, the larger the herd the higher the income. The increase in income was greatest in moving from small herds to moderate sized herds. But the increase at a slower rate carried on right up to the largest herds, those of 100 or more cows.

The shaded area along the line shows the variability in incomes. In each size group, one-half of the cases fall within the shaded area. The greater the width of the area, the greater the variability in income. Note that incomes of farms with large herds were much more variable than were incomes of farms with small herds.

Why Large Size of Herd Pays

Higher crop yields and larger amounts of milk sold per cow are two

explanations why large herds were more profitable than small herds. There are others. Large size of herd makes possible gains in the efficiency of labor and of capital investment in machinery and buildings. Let us look at some of these relationships.

28 Cows per Man on Large Farms

The larger the herd, the higher the labor efficiency as was shown in letter number 4. The figures are stated in more detail here.

On farms with small herds, 6 to 19 cows and averaging 15, the labor force in terms of man equivalent was 1.3. This meant 12 cows cared for per man on the average. Average age of operator (54 years) in this group of farms was some 10 years older than that of each of the other groups.

The labor force increased, of course as size of herd went up, but not in a fixed ratio. On 40 to 59 cow farms, averaging 48, the labor force was a little more than 2 men. In this group, 23 cows were cared for per man. The highest labor efficiency was obtained on the largest farms. On farms with 100 or more cows and averaging 131, about 5 men were employed. On these farms, the number of cows per man averaged 28:

Cows per farm	Man equiv. per farm	Cows kept per man
6 to 19	1.3	12
20 to 39	1.7	19
40 to 59	2.2	23
60 to 99	3.1	24
100 or more	4.9	28

High labor efficiency is one of the major advantages of large farm businesses over small ones. The use of labor is, of course, influenced by the amount of power and machinery on the farm.

More Machines on Large Farms

Large farms were found in this study to be more fully mechanized than were small farms, as described in letter number 5.

The power and machinery investment per cow was about the same in the various size-of-herd groups, except for the group of largest herds. The expense per cow did go down markedly, however, as size of herd increased. For the most common size of herd, 20 to 39 cows, the expense averaged $128 per cow. But for the largest herds, 100 or more cows, it was only $93:

Cows per farm	Power & machinery	
	Investment per cow	Expense per cow
6 to 19	$337	$144
20 to 39	346	128
40 to 59	327	118
60 to 99	320	116
100 or more	245	93

It is apparent that good labor efficiency was attained on large farms without excessive expense for power and machinery. In fact, second only to the labor advantage of a large business is the full use of equipment in such a business.

Real Estate Expense no Higher

Large size has still another advan-

tage. The investment in land and buildings amounted to $600 to $700 per cow, except for the 6 to 19 cow group, where it was $970 per cow. At least one residence is usually involved irrespective of the size of herd.

The annual expense for real estate, including interest, depreciation, repairs and other items, on a per-cow basis, was no higher on large farms than on medium sized farms. This was true despite the fact that large farms generally had more new and remodelled buildings than small farms:

Cows per farm	Real estate	
	Investment per cow	Expense per cow
6 to 19	$970	$85
20 to 39	670	69
40 to 59	600	62
60 to 99	660	68
100 or more	730	68

Spreading the overhead expense for land and buildings over many units is a third major advantage of a large farm business.

How Large Should a Dairy Farm Be?

The data from this study show that for this region most of the advantages to be gained from size of business alone in the use of labor and machinery were attained where size of herd reached about 60 cows. With present kinds and sizes of machines, some such number of cows permits reasonably full use of machinery as well as of labor. The addition of major investments, like a milking parlor, favors or even compels a herd size larger than 60 cows.

In more general terms, the dairy farm operation should be large enough to provide:

(a) full employment for at least 2 men, and
(b) economic use of major machines, like balers and bulk milk tanks.

This 60-cow figure is stated with the full realization that nearly three-fourths of the farms in the region had fewer than 40 cows, and that only one farm in 14 had as many as 60 cows. But any farmer should have in mind what the optimum size of operation is for his region. Then, for him, size of operation depends on his experience, knowledge, available capital and his personal goals.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

You are urged to enroll in the TV Farm Management course which begins Saturday, January 27, 1962. This 5-lesson series is based on the results of the Oneida-Mohawk region study. As with these letters, we want to bring the findings of the study to your home and help you apply them to your own situation. Get in touch with your county agricultural agent to enroll (the fee is $1) and get your packet of material-a workbook and inventory and account books.

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AND HOME ECONOMICS, STATE OF NEW YORK

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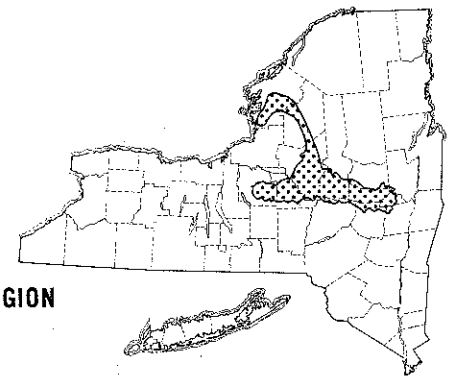


DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 12

January 26, 1962

To Farmers Visited on
Farm Management Survey:

The average number of cows kept per man was 18 and the amount of milk sold per man was 151 thousand pounds on the cross-section sample of farms surveyed in the Oneida-Mohawk region. These and other characteristics of the labor force were described in letter number 4. Let us turn in the present letter to the relationship of labor efficiency to other farm business factors and to labor income.

The analysis of relationships is based on the records of the three size-of-herd groups of farms, 20 to 39 cows, 40 to 59 cows and 60 to 99 cows, in which size is held nearly constant. Since increasing size of farm operations is one of the principal ways of improving labor efficiency, this analysis emphasizes relationships exclusive of the effect of the size factor.

Number of Cows per Man

Relation to milk per cow and to roughage per cow. When the records in each size group were sorted by the number of cows kept per man, two important relationships bearing on production were found. As the number of cows per man increased, the amount of milk sold per cow tended to decline, especially with 30 or more cows per man. Also, the amount of roughage harvested per cow decreased moderately.

Take the 40 to 59 cow farms for example. On farms where less than 15 cows per man were kept, milk sales averaged 8,870 pounds per cow and hay equivalent 6.4 tons per cow. But on farms with 30 or more cows per man, milk per cow was down to 8,180 pounds and hay equivalent per cow only 5.2 tons:

Cows per man	Pounds milk sold per cow	Tons H. E. harvested per cow
Less than 15	8,870	6.4
15 to 19	8,840	5.8
20 to 24	8,700	5.4
25 to 29	8,480	5.2
30 or more	8,180	5.2

As the number of cows per man increased, milk per cow was maintained up to 30 cows per man in the 20 to 39

cow group, but it decreased significantly in the 60 to 99 cow group.

Relation to size of labor force and to machinery. Within each of the three size-of-herd groups the farms with high labor efficiency, in terms of cows per man, had a considerably smaller labor force per farm than did those with low efficiency. Furthermore, they actually had somewhat lower power and machinery expense per farm. The high efficiency was attained by fitting the size of the labor force tightly to the size of the job to be done and apparently by cutting corners wherever possible.

In the 40 to 59 cow group, farms with 30 or more cows per man had an average man equivalent of less than half as large as that for farms with less than 15 cows per man. Even so, average power and machinery expense per farm was smaller than on the farms with less than 15 cows per man:

Cows per man	Man equiv. per farm	P. & M. expense per farm
Less than 15	3.4	$6,580
15 to 19	2.7	5,730
20 to 24	2.2	5,620
25 to 29	1.8	5,730
30 or more	1.4	4,990

Relation to labor income. The average labor income rose rapidly and fairly consistently with increases in the number of cows per man, except in the 60 to 99 cow group.

In the 40 to 59 cow group, the average labor income was about $4,600 where 30 or more cows were kept per man, as compared with only about $1,100 where there were less than 15 cows per man. Most of this increase in income is due to the saving in labor, since size of herd was about constant and milk per cow went down with the increasing number of cows per man:

Cows per man	Average labor income
Less than 15	$1,090
15 to 19	2,540
20 to 24	3,580
25 to 29	3,440
30 or more	4,640

The relationship to income was similar in the 20 to 39 cow group of farms. But in the large herds, 60 to 99 cows, average incomes did not increase as cows per man went up, apparently because the large decrease in milk per cow just about offset the saving in labor. This is a good illustration of the point that it does not pay to keep so many cows per man that the level of milk production per cow is depressed.

In this study, the maximum number per man appeared to be about 30 and the optimum number roughly 25.

Amount of Milk Sold per Man

This is a kind of composite measure of efficiency. Obviously, it is influenced not only by the number of cows kept per man but also by the rate of milk production per cow as well. Labor efficiency measured in this way tells more about the success of a dairy farm than any other factor.

Relation to cows per man and to emphasis on milk. High output of milk per man was associated with a large number of cows cared for per man, as would be expected, and with a relatively high proportion of milk in total products.

In the 40 to 59 cow group, for example, with less than 100 thousand pounds of milk sold per man only 15 cows were cared for per man on the average. This was true despite the fact that milk per cow was much lower in these herds, as was shown in the preceding section. And milk was only 55 percent of all products. But with 250 thousand pounds or more of milk per man, 29 cows were kept per man and about 75 percent of the total products was milk:

Thous. lbs. milk sold per man	Cows per man	% milk is of total products
Less than 100	15	55
100 to 149	18	65
150 to 199	20	70
200 to 249	23	72
250 or more	29	74

Relation to milk sold per cow and to season of milk production. The farms with high output of milk per man had relatively high-producing herds. In the 40 to 59 cow group, farms with less than 100 thousand pounds of milk sold per man had herds that averaged only about 5,400 pounds of milk sold per cow. But farms with 250 thousand pounds per man had herds that averaged nearly 9,900 pounds per cow.

Farms with high output per man also had more uniform seasonal milk production that did those with low output:

Thous. lbs. milk sold per man	Pounds milk sold per cow	Percent milk sold Oct.-Mar.
Less than 100	5,410	42
100 to 149	7,240	47
150 to 199	8,470	47
200 to 249	9,590	51
250 or more	9,880	49

Relation to labor force and to machinery. On farms where a large amount of milk was sold per man, the labor force generally was geared closely to the size of the job to be done. The amount of milk per man seemingly showed little relation to mechanization expense per farm. That is, as the amount of milk sold per man increased in each size of herd group, the size of the labor force declined, but the power and machinery expense per farm was about unchanged in the 20 to 39 cow and 40 to 59 cow groups and increased only moderately in the 60 to 99 cow group.

Let us look at the figures for the 40 to 59 cow farms. On farms with less than 100 thousand pounds of milk sold per man, the man equivalent averaged 3.0 per farm and the expense for power and machinery was about $5,900 per farm:

Thous. lbs. milk sold per man	Man equiv. per farm	P. & M. expense per farm
Less than 100	3.0	$5,890
100 to 149	2.7	5,590
150 to 199	2.4	5,420
200 to 249	2.1	6,140
250 or more	1.6	5,380

But on farms with 250 thousand or more pounds per man the labor force was considerably smaller, only 1.6.

With a given herd size, the high labor efficiency farms sold more milk with a smaller labor force and practically the same amount of machinery expense - about $125 per cow.

Relation to labor income. The amount of milk sold per man was closely related to labor income. In all three size groups, as milk per man went up, incomes went up. The income response was greater, however with large herds than on small ones.

The relationship to income on the 20 to 39 cow farms and on the 40 to 59 cow farms is shown graphically in the accompanying charts.

On the 20 to 39 cow farms (upper graph), the average labor income was minus with milk per man at a level of only about 75 thousand pounds, but increased rapidly as output reached 175 thousand pounds per man. Beyond this amount, the income advantage continued to gain but at a slower rate of increase, because size of herd tended to place a ceiling on income. With about 300 thousand pounds per man, the average labor income rose to about $4,500.

The shaded area along the line shows the variability in incomes. In each milk-per-man group one-half of the cases fall within the shaded area. The almost uniform width indicates similar variability in all of the income averages.

On 40 to 59 cow farms (lower graph), those farms with low output of milk per man also had a minus average labor income, but as milk per man went up, incomes increased. Beyond 175 thousand pounds per man, incomes went higher than on 20 to 39 cow farms. In this situation of larger herds, output of about 300 thousand pounds of milk per man raised the level of income to nearly $6,500. In general, incomes covered a wider range in this relationship than in the one based on the 20 to 39 cow farms.

Summary

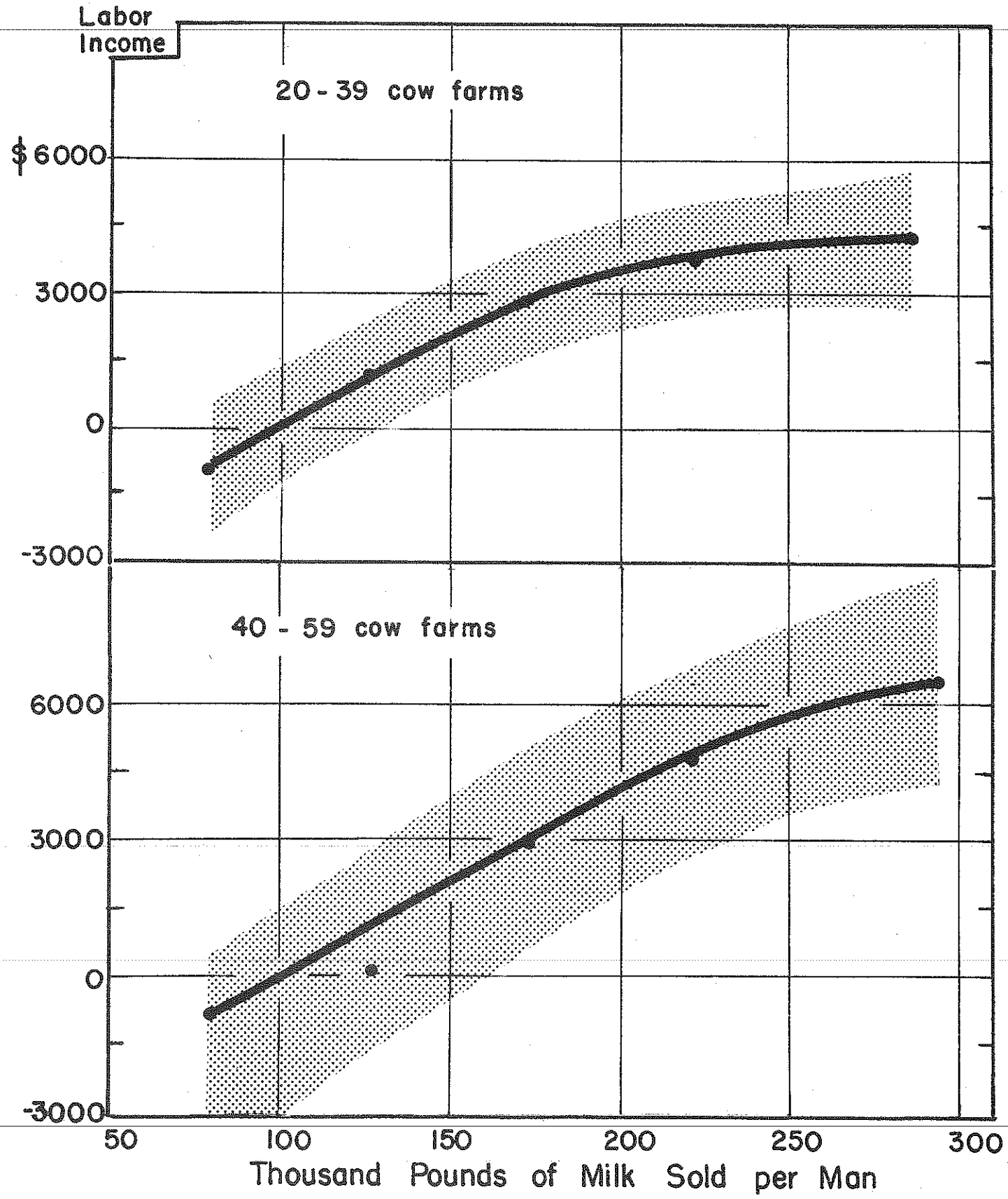
There is a close and positive relationship between labor efficiency and labor income. The larger the herd, the more striking the relationship. On average, 50 thousand pounds additional milk per man meant $1,500 additional labor income. Highly efficient dairymen in this region sold about 300 thousand pounds of milk per man. Such high output per man was found to be closely related to these farm practices:

a) Run about 25 cows per man.
b) Hold power and machinery expense to no more than $125 per cow.
c) Sell at least 10,000 pounds of milk per cow.
d) Produce some 50 percent of the year's total milk in the 6 months, October to March.
e) Make milk output the central job of the labor force.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist



AMOUNT OF MILK SOLD PER MAN AND LABOR INCOME, BY SIZE OF HERD
493 dairy farms, Oneida-Mohawk region, New York, 1959-60

A Reminder To You

Our TV Farm Management course of 5 lessons on Saturdays began January 27. We welcome this opportunity to bring to you in the comfort of your own home the highlights of this Oneida-Mohawk region study. The findings can be of great help in planning your farming operations for the years ahead. Have you enrolled? See your county agricultural agent soon and get your packet of materials, including the TV workbook prepared especially for this course.

Station		Channel	Time
Utica	WKTV	2	1:00 to 1:30 p.m.
Syracuse	WSYR-TV	3	7:00 to 7:30 a.m.
Schenectady	WRGB	6	12:30 to 1:00 p.m.
Watertown	WCNY-TV	7	12:30 to 1:00 p.m.

COOPERATIVE EXTENSION WORK IN AGRICULTURE
AND HOME ECONOMICS, STATE OF NEW YORK

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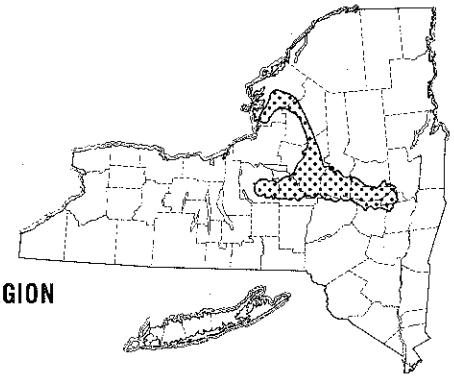

DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 13

February 9, 1962

To Farmers Visited on
Farm Management Survey:

Where are you headed with your farm business in the next decade? The systematic study of farms, such as this study of the Oneida-Mohawk region, provides not only a cross-section picture of the farming in the region. The study also enables us to establish some reasonable and practical goals for an individual dairy farmer.

These goals are based on attainments by significant numbers of top farmers, not just by one or two outstanding individuals. We don't want to imply that these goals are what everyone must reach right away. Rather, we mean aims to work toward in the future. Such goals can give direction and tempo to your efforts. Also, they can give "balance" to your plans, and prevent your riding a particular hobby.

1. Keep 60 or more milk cows. The region-wide average was 34 cows per farm. Nearly two-thirds of the dairy farms had fewer than 40 cows. To the operators of these farms, this goal of 60 milkers may look pretty high. However, 7 out of every 100 had already reached or exceeded the goal. The goal is set up with the conviction that the dairy farm business should be large enough to provide:

a) full-time work for 2 men, and
b) economic use of major pieces of equipment such as a baler, gutter cleaner and bulk milk tank.

This goal means neither 20 cows nor 200, but in the neighborhood of 60 cows. Our ideas about size of herd have changed over the years, of course, and will continue to change as mechanization in dairy farming increases.

2. Provide 2.5 crop acres per cow. This goal refers to the intensity of stocking of your farm with cattle. By crops we mean the acres harvested by man. Pasture acreage is not included. The average for the region was 3.0 acres of crops per cow. Widely different intensities were found from farm to farm.

It is a real art to attain the optimum combination of cows and cropland. Land

is not always available at the time or in the acreage needed for a given-sized herd. Lots of things must be taken into consideration like a) kind of land, b) crop yields, c) amount of grain raised, d) productivity of pastures, and e) amount of young stock. The area of cropland must be large enough to supply ample roughage for the herd. On the other hand, the expense for improving and maintaining cropland is significant. Hence, the advisibility of providing just the optimum acreage per cow.

3. Obtain above-average crop yields. Raise per-acre yields of at least 3.0 tons of hay, 15 tons of corn silage, and 80 bushels of oats. Average yields per acre for the region in the year of the study were: hay 2.0 tons, corn silage 11 tons and oats 58 bushels. As a rule of thumb, you can afford to aim for feed-crop yields some 50 percent above the average of your area.

These yield goals were attained on roughly 20 percent of the farms in the study. They apply to the entire acreage of each crop on a farm, not just to a particular field. Such yield goals involve consideration of: a) soils, b) intensity of stocking with cattle, c) use of commercial fertilizer, d) choice of crop varieties and hybrids, e) weed control, and f) other management practices.

4. Harvest at least 6 tons of hay equivalent per milk cow. Quality is as important as quantity. So let's add - first cutting of hay completed at least by June 30. Average farmer experiences in the region were: 5.6 tons harvested per cow, 46 percent of first-cut hay harvested by June 30. This goal is easier to attain if hay and grass and corn silages are produced, rather than hay only.

We should consider these points in interpreting this goal: a) number of heifers - normal is 1 for each 2 cows, b) feed from pasture, c) supplemental summer feeding, d) losses in storage, e) breed of cows, and f) carryover or sales of roughages.

5. Sell 12,000 pounds or more of milk per cow. The average for all farms in the study was 8,130 pounds sold per cow. This figure is on the basis of 3.7 percent butterfat. Also, remember, this is the amount of milk sold, not the total produced. In the study, 4 percent of the farms reached this goal. It is about 3,000 pounds per cow above the average of all of the herds of 60 or more cows. Many management practices in addition to those discussed in these letters are involved in the attainment of this goal.

6. Produce 50 percent of milk in winter. This goal calls for even milk production the year-round. In specific terms, it is 50 percent of the year's total milk produced in the 6 months October to March. The average for the region was 49 percent.

Year-round production not only matches fluid milk market requirements, but also makes good use of labor on the farm. It costs more to produce milk in the winter than in the summer. But even production is more economical, and results in a higher price for the year than highly seasonal spring or summer production.

7. Keep percentage of cows removed within 10 to 20 percent. This goal is to hold the number of cows removed

from the herd during the year to within 10 to 20 percent of the beginning number of cows. In the region, 21 percent of all cows were disposed of during the 12-month period. About 40 percent of the farms met this goal in the year of the study. However, one farm in every six "culled" 30 percent or more of their cows. Loss on cows is heavy at such high rates of culling. Disease control is, of course, of great importance in attaining the goal.

8. Spend not more than 20 percent of milk sales for feed. The average for the region was 23 percent, with wide differences among farms. Believe it or not, but some farmers spent as high as 40 percent of their milk checks for feed. Feed bought includes mixed rations and hay, if any. Admittedly this is a hard goal to attain, unless you harvest a liberal supply of good roughage - our fourth goal. Attainment of the goal depends in part on the amount of homegrown grain. The average amount of spring grains was 17 acres per farm, or one-half acre per cow.

9. Sell 300,000 pounds or more of milk per man. Average for the region was about 150,000 pounds of milk sold per man. This is perhaps the most important goal of all. It is practically not attainable in small or even moderate-sized herds. It was reached by about one farm in 25 in the region. To reach it requires: a) a good-sized herd, b) high-producing cows, and c) labor saving equipment. It does not necessarily mean long hours. But it does mean careful planning and good farm organization. You might say 'give me the money for equipment and I can make such a goal easily'. That statement relates to our tenth and final goal.

10. Keep expense for power and machinery under $125 per cow. The average expense in the region was $128 per cow, but there was a wide variation from farm to farm. Some farms had only about $70 of expense, but others spent more than $200 per cow. Because of the trend to more mechanization, it is unusually important to study this phase of your farm operations. It is easy to misjudge, particularly under the pressure of a good salesman. Because of the uptrend in the use of equipment, this goal will undoubtedly change with passing time.

The Innovators

With respect to these goals for dairymen generally, we recognize that there are individual operators who exceed one or more of them by wide margins. For example, in the study five farms had upwards of 150 cows each, two dairymen sold more than 14,000 pounds of milk per cow, milk sales per man on one farm exceeded 400,000 pounds.

These aggressive farmers we call "innovators" - those who are trying new things. They have pushed some frontiers of farm operation into new, high ground. These innovators are interesting to watch, and they add to our knowledge of dairy farming. Further testing of these new experiences is necessary, however, to tell which ones are novelties and which are profitable practices. Until then, such performances should not be accepted as realistic goals.

Check List of Goals

Below is a list of these goals. Check the ones that you have reached. How many of them have you attained? Our guess is that you may be just a little disappointed in the number you have reached. Very few farms in the whole study had attained all of them.

You are urged to proceed with the development of plans to meet all of the goals in the years ahead. It is much wiser to strive for all of them than to reach or even exceed 2 or 3 of them but neglect or ignore the others.

Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

FARM BUSINESS GOALS FOR DAIRYMEN
Oneida-Mohawk region, New York

Check the goals that have been reached:

_____ 1. Keep 60 or more milk cows.

_____ 2. Provide 2.5 crop acres per cow.

_____ 3. Obtain above-average per-acre crop yields, i.e., 3.0 tons of hay, 15 tons of corn silage, 80 bushels of oats.

_____ 4. Harvest at least 6 tons of hay equivalent per cow.

_____ 5. Sell 12,000 pounds or more of milk per cow.

_____ 6. Produce 50 percent of year's milk during the 6 months, October to March.

_____ 7. Keep percentage of cows removed within 10 to 20 percent.

_____ 8. Spend not more than 20 percent of the year's milk sales for purchased feed.

_____ 9. Sell 300,000 pounds or more of milk per man.

_____ 10. Keep expense for power and machinery to less than $125 per cow.

COOPERATIVE EXTENSION WORK IN AGRICULTURE
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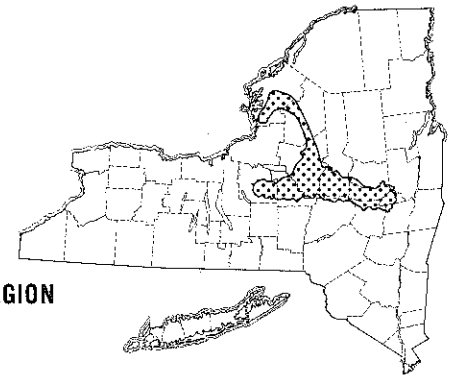


DAIRY FARMING in the ONEIDA - MOHAWK REGION

Letter No. 14

March 15, 1962

To Farmers Visited on
Farm Management Survey:

Our final letter in this series to report findings of the study of commercial dairy farms in the Oneida-Mohawk region deals with the ever-interesting subject of the cost of producing milk. What was the average cost? How did unit costs vary from farm to farm? What is the significance of costs?

Average Cost $4.76 per 100 Pounds of Milk

On the sample of 223 farms in the region, farm expenses averaged $13,650 per farm (letter number 7). To this sum were added interest on capital at a 5 percent rate in the amount of $2,287 and a wage allowance for operator and partner labor at average hired men's wages ($200 per month) in the amount of $2,572 per farm. There were 16 partners to the 223 operators. The total of these charges for labor, land, buildings, cattle, machinery, and all other inputs was $18,509 per farm:

Items	Average per farm
Total farm expenses	$13,650
Interest on capital	2,287
Operator wage allowance	2,572
Total costs	$18,509

These inputs produced 278,067 pounds of milk that sold for $12,873 and $5,274 worth of cattle and other income. The income other than milk was credited against total charges to obtain the net cost of the milk sold - $13,235 per farm:

Items	Average per farm
Total costs	$18,509
Income other than milk	5,274
Net cost of milk sold	$13,235

This net cost of milk sold averaged $4.76 per 100 pounds, or 10.2 cents per quart.

On this "whole farm basis" of calculating milk production costs, any profits or losses of other enterprises are merged into those of the major enterprise-dairy cows.

Unit Costs Varied Widely from Farm to Farm

Some farms produced milk much more economically than others. Eight percent of the 223 farms had costs of less than $3.50 per 100 pounds and another 28 percent had costs under

$4.50. These two groups of farms accounted for 50 percent of the total milk sold.

Other farms had comparatively high unit costs. Costs of $6.50 or more were found on 20 percent of the farms, although this group accounted for only 9 percent of the total milk. The balance of the farms had costs in between these extremes:

Cost per 100 lbs. of milk	Percent of farms	Percent of milk
Less than $3.50	8	13
3.50 to 4.49	28	37
4.50 to 5.59	28	29
5.50 to 6.49	16	12
6.50 or more	20	9
Total	100	100

Large Herds Had Lower Costs

In addition to the records of the 223 farms representing a cross-section of all dairy farms in the region, records were obtained on many other large farms. Thus, averages and variations are available for these herds also.

Some of the variation in unit costs was associated with herd size. Within the limits of farmer experience, the larger the herd on the average the lower the cost. The biggest change occurred, however, in moving from small herds to moderately large herds. Costs averaged about $6.50 on farms with herds of 6 to 19 cows, and dropped to nearly $5.00 on 20 to 39 cow farms. This is a decrease of almost $1.50. Costs declined further to about $4.40 on 40 to 59 cow farms, a decrease of another 66 cents. Gains in efficiency continued but were less striking in still larger herds. Costs averaged $4.15 in 60 to 99 cow herds and about $4.00 in herds of 100 or more cows, averaging 131 cows:

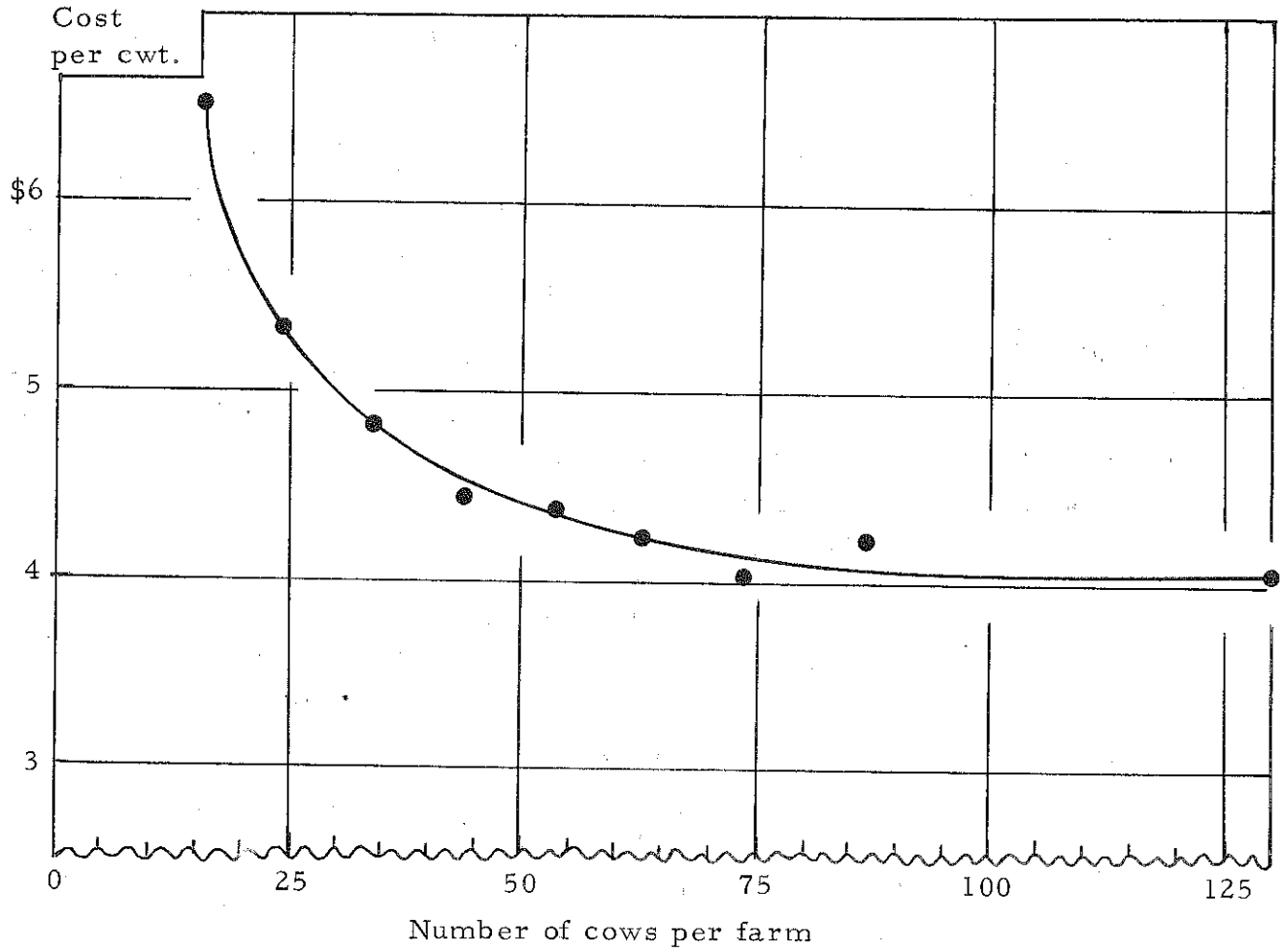
Cows per farm	Number of farms	Average cost per 100 lbs. of milk
6 to 19	33	$6.52
20 to 39	192	5.08
40 to 59	271	4.42
60 to 99	233	4.15
100 or more	33	4.01

The relation of size of herd to costs is shown graphically in the accompanying chart. Number of cows per farm is shown on the horizontal scale at the bottom of the chart. Cost per 100 pounds of milk is shown on the vertical scale at the left. The dots represent average costs for each size-of-herd group. The solid line represents the average relationship. Sharp reductions in costs were made as size increased from small herds to moderately large herds, and additional small reductions were made in large herds. The amount of milk sold per cow was higher in large herds than in small herds. Therefore, part of the reduction in cost was due to this factor.

Costs Varied Within Size-of-Herd Groups

Although differences in herd size accounted for some of the variation in unit costs, considerable variation in costs was found within major size-of-herd groups.

In the 20 to 39 cow group, 7 percent of the milk was produced for less than $3.50 per 100 pounds and 36 percent at costs within the range of $3.50 to



RELATION OF SIZE OF HERD TO COST PER 100 POUNDS OF MILK
762 dairy farms, Oneida-Mohawk region, New York, 1959-60

$4.49. But 13 percent of the milk was produced at a relatively high cost - $6.50 or more:

Cost per 100 lbs. of milk	Cows per farm		
	20-39	40-59	60-99
	Percent of milk		
Less than $3.50	7	16	23
3.50 to 4.49	36	45	45
4.50 to 5.49	31	23	25
5.50 to 6.49	13	13	6
6.50 or more	13	3	1
Total	100	100	100

Likewise, in the 40 to 59 cow and 60 to 99 cow groups, milk was produced at varying cost levels. It is worthy of note, however, that only a small proportion of the milk was produced at high costs in large herds. Large herds with high costs are soon put out of business.

Average Cost Exceeded Price by 13 Cents

The average price received for milk sold from the 223 farms was

$4.63 per 100 pounds, 13 cents less than the average cost. Both the price and cost figures are for milk of 3.7 percent butterfat content. The excess of cost over price simply means that labor (or other items of cost) did not earn the rate at which it was charged. Operator labor in the cost calculation was charged at $2,400 for the year, as shown earlier. Actual income fell short of this figure. The average labor income per operator was $1,950.

Amount of Milk per Cow Necessary to Break Even

In the group of farms with 20 to 39 cows, averaging 29, the rate of milk production necessary to break even was 8,800 pounds or more of milk sold per cow. In the group of farms with 40 to 59 cows, averaging 48, the break even point was at least 7,800 pounds of milk per cow, and in the group with 60 to 99 cows, averaging 71, it was 7,500 pounds per cow.

Relation of Unit Costs to Price of Milk and Labor Income

Unit costs showed little relation to average prices received for milk, but a strong inverse relation to income. Farms with costs of less than $3.50 per 100 pounds of milk, received $4.59 for milk and made an average labor income of nearly $8,500:

Cost per 100 lbs. of milk	Price received per 100 lbs.	Average labor income
Less than $3.50	$4.59	$8,470
3.50 to 4.49	4.65	4,560
4.50 to 5.49	4.61	1,510
5.50 to 6.49	4.61	-240
6.50 or more	4.62	-1,900

As costs went up, the price of milk was about unchanged, but incomes fell sharply. Farms with costs of $6.50 or higher made an average loss of nearly $2,000.

An individual dairyman can sometimes bargain for a few cents premium for his milk, and this obviously helps to improve income. But cost reduction is by far the most important way to increase net income. Each 10 cents per 100 pounds reduction in cost raised, on the average, the labor income about $250 during the year of this study.

The farm management practices that raised incomes, as discussed in previous letters, did so usually by reducing unit costs.

Cost is One Measure of Efficiency

Unit cost of milk production is a composite measure of overall dairy farm efficiency. There are many facets of farm operation - crop production, use of labor, power and equipment, herd replacement, milk production, and the like - each of which may be judged by one or more tests, but all of the operations are reflected in the cost of producing 100 pounds of milk.

In this sense, the unit cost of milk is similar in usefulness to labor income - the return to the operator after paying farm operating expenses and interest on capital investment. Both are gauges of how well the business is operated. As was shown, there is a close inverse correlation between the two measures. A limitation of the cost measure, however, is the inclusion of an arbitrary wage allowance for each operator. Some farms are so small or otherwise inefficient that labor

does not usually earn much of any wage. This is a partial explanation of the very high unit costs on some farms. Labor income is, of course, affected by the price received for milk as well as by the cost of production.

A comparison of the cost with the price received shows whether the operators received more or less than the wage assigned, the interest rate on capital used, or the cost of any other item charged, in the calculation. The labor income shows directly what the operator received for his labor and management for the year. The traditional use of cost as a criterion of price is of continuing interest, but such use is of less economic significance than as a measure of production efficiency.

Cost Comparisons by Regions in New York

Similar studies of the cost of milk production have been made for other regions of New York, although for different years.

In the Plateau region for 1957-58, the average cost of producing 100 pounds of milk was $4.94 on hill farms and $4.50 on valley farms.

In the North Country region for 1955-56, the average cost was $4.45. The comparatively low cost was largely because of the extensive nature of dairying in that region.

In the Central Plain region for 1953-54, the average cost was $4.59 per 100 pounds of milk.

Simple comparisons of these average costs by regions are difficult because economic conditions have changed over the period covered by the studies. In general, average costs were in the range of $4.50 to $5.00 in these regions. Quality of land resource and intensity of dairying were related to costs. Farm to farm variations in unit costs of milk were much more important, however, than differences in average costs between regions.

Average costs exceeded average prices received for milk in all regions except on valley farms in the Plateau region. The cost-price disparity was greatest for the North Country and for hill farms in the Plateau.

Last Letter of Series

This brings to a close the series of letters to report major results of the Oneida-Mohawk region survey.

This systematic study of the experiences of groups of dairymen in the operation of their farms has provided useful benchmarks or standards by which to judge individual farms and with reliable guides for farming in the future. We hope the findings are helpful to you in knowing your farm and your region.

Thanks for your cooperation and best wishes for your success in dairy farming.

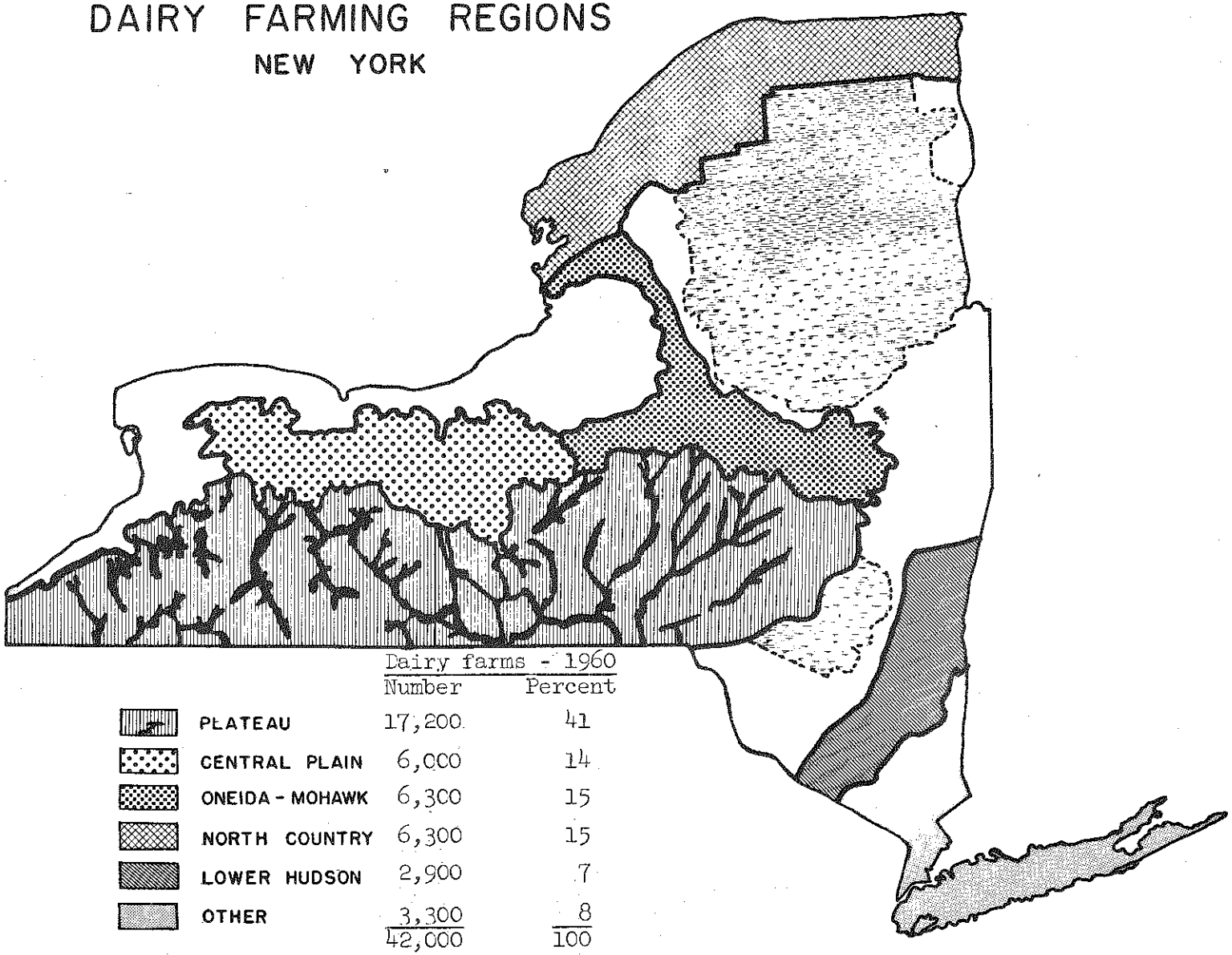
Yours truly,

L. C. Cunningham

L. C. Cunningham
Extension Economist

DAIRY FARMING REGIONS

NEW YORK



	Dairy farms - 1960 Number	Percent
PLATEAU	17,200	41
CENTRAL PLAIN	6,000	14
ONEIDA - MOHAWK	6,300	15
NORTH COUNTRY	6,300	15
LOWER HUDSON	2,900	7
OTHER	3,300	8
	42,000	100

SUMMARY

Region. The Oneida-Mohawk region covers a 20-mile belt in the Mohawk Valley and a narrower strip of country in the Black River Valley. Parts of ten counties are included. It extends from Syracuse on the west to Schenectady on the east and to Watertown on the north. This is one of the important lowland areas of the state. The land resources are similar to those in the Central Plain region of western New York, but the elevation is higher, the growing season is shorter and the topography is more rolling in some parts of the region.

People. In the open countryside three-fourths of all the places were rural residences - occupied by people with no direct interest in farming. Twenty-one percent of the places were commercial farms - run by essentially full-time operators. The other 5 percent of the places were part-time farms, whose occupants had off-farm jobs and also did some farming.

Farms. Some 6,300 dairy farms, or 15 percent of the state's total, are located within the region. About 80 percent of them are full-time commercial dairy farms. This study is based on a random sample of these farms.

The average labor force per farm amounted to the equivalent of nearly two men. Herd size averaged 34 milk cows per farm. Nearly 100 acres of crops, mostly for feed, were harvested per farm. These dairymen sold, on the average, 8,130 pounds of milk per cow.

To the question 'what is the current market value of the land and buildings used in your operations?' the average of farmers' answers was about $21,000 per farm. The total money invested averaged about $47,000 per farm. Thus, capital investment amounted to $26,000 per worker - about $10,000 higher than the average per worker in all manufacturing industry in the nation.

Average labor income. The average labor income per operator of the 223 farms amounted to $1,950, or about $160 per month. As a measure of financial success in this study it is used to compare individual farms and groups of farms. If comparisons are to be made with incomes of non-farm groups, the value of the living, including dwelling, obtained from the farm should be added. Thus, the average labor earnings in this region were $2,750.

Variation in incomes. Incomes of most industrial workers are fairly uniform from worker to worker, but incomes of individual dairymen were found to vary widely. These income differences occurred even within the groups of farms with broadly similar size of herds. The larger the herds, however, the greater the variation in incomes.

Rates of crop and milk production. High crop yields provided more feed for cattle, which in turn meant more milk per cow. Hence, the effect of high crop yields on labor income was favorable. Of the cropping practices studied, heavy applications of plant food from stable manure and commercial fertilizer gave the largest increase in crop yields.

The rate of milk production per cow made the difference between high incomes and low incomes. A 1,000-pound increase in milk per cow raised the average labor income on small farms about $700, on medium sized farms $1,500, and on large farms $1,800. The rate of milk flow per cow went up as the amount of dairy feed bought increased, but it was profitable to buy additional feed only where high crop yields were obtained.

Size of farm business. Differences in herd size accounted for much of the variation in incomes. Generally speaking, as the number of cows per farm increased, income went up. The increase in income was greatest in moving from small herds to moderate sized herds, because of large gains in efficiency of production. Herds larger than 60 cows did not have lower unit costs, but returned higher incomes because of the multiplier effect (number of units sold x a given margin between prices and costs). The chance of making a good income with a small herd was extremely limited. With a large herd, there was a chance for loss, but the odds of making a good income were favorable. A dairy farm business should be large enough to provide: a) full-time work for 2 men, and b) economic use of major pieces of equipment such as a baler, gutter cleaner and bulk milk tank. Under the conditions of this study, a herd of about 60 milk cows fulfilled these requirements.

Use of labor and machinery. If less than 100,000 pounds of milk was sold per man, the return to labor was usually small or even nonexistent. However, if as much as 300,000 pounds of milk was sold per man, income was excellent. Such a high output per man was the most important key to success in dairy farming. Dairymen who obtained high output per man matched their labor force with considerable outlays for equipment.

Cost of producing milk. The average cost of producing 100 pounds of milk was $4.76. One-half of the milk was produced at a cost of less than $4.50. About 20 percent of the milk was produced at costs in excess of $5.50. The average price received per 100 pounds of milk was $4.63. Each 10 cents per 100 pounds reduction in cost raised, on the average, the labor income about $250 during the year of this study.

Similar studies of other dairy regions in New York show that average costs were in the range of $4.50 to $5.00 per hundredweight. Cost levels were affected by land resource and intensity of dairying. Farm to farm variations in unit costs of milk were much more important, however, than differences in average costs between regions.