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EIGHTY YEARS OF CHANGE IN DAIRY FARMING

**Dryden Township, Tompkins County,
New York**

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ABSTRACT

Changes in dairy farming in the Dryden Township between 1977 and 1987 are examined and compared with ten year changes obtained in similar studies made every ten years since 1907. Total output from this constant land area increased in this ten year period even though farm numbers and resources used in commercial farming decreased. Productivity increases in this township mirror those for the State DFBS farms. This report continues the research initiated by G. F. Warren with the first successful farm management survey made in this country in 1907.

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The first successful survey of farm business activity in the United States was carried out in Tompkins County, New York by George Warren and K. C. Livermore for the 1907 calendar year. Cornell University Experiment Station Bulletin Number 295, which reported the results of that study, is widely regarded as a landmark publication. Labor income records were obtained from 749 farms in four townships: Ithaca, Dryden, Danby, and Lansing. Any business unit where the primary source of family income was farming was enumerated. Many of the basic principles and illustrations for Warren's text, Farm Management, were drawn from this historic study.

Ten years after the first survey, a second study was conducted for the 1917 financial year to examine the nature of change over the decade. Because the dairy enterprise was most important on most farms, full-time dairy farms were central to that study. Because of the war, records were only obtained for the Dryden township. Since that time, an agricultural survey has been completed every ten years for all dairy farms in Dryden. Such a study was conducted again for the 1987 year using an adaptation of the long form of the Agricultural Census to collect the data, because the U.S. Census was being conducted during the same period.

Purpose

The intent of the successive ten-year studies has been to document and analyze the pattern and rates of change over time in dairy farming in an area where commercial farming has competed quite effectively with alternative uses for land such as suburban and urban development or recreation. Looking back at the four towns studied in detail in 1907, Ithaca is now largely a suburban community; the primary use of land is for housing and associated development. Danby's soils and agricultural land in the hills of the Southern Tier are not well adapted to mechanized commercial agriculture; most of the land has returned to brush and forest over the

¹This study could not be completed without the cooperation of Dryden's commercial dairymen, who, because of their proximity to Cornell, are too often asked to participate in studies of various kinds. Our special thanks to them and those who have provided records in the past. This summary has profited from the careful review of Wayne Knoblauch, Stuart Smith and S. W. Warren who directed the Dryden studies in 1947, 1957, and 1967. Carl Crispell, extension farm management specialist for this area, was instrumental in obtaining a number of the records. Errors in fact or interpretation rest with the author.

past 80 years. Only a very small proportion of the land remains in commercial agriculture. Lansing, in contrast, has some of the most productive soils in Tompkins County. Farmers have more options; cash crops rival dairying for land use in the northern half of the township, while suburban development is the major influence in the southern portion.

Dryden has more nearly mirrored changes in land use and the structure of commercial agriculture in the rest of the State. Suburban influences are of growing importance particularly in the most recent two decades. Many Dryden residents work in Ithaca, or Cortland. The route 13 highway corridor is increasingly commercialized. The hill portion of the township has largely reverted to forest or been converted to recreational and suburban land uses. The more productive soils and lands, well adapted to commercial agriculture, continue in farming.

Number of Farms and Land Use

In 1907 when the first complete enumeration survey was conducted in the township, commercial agriculture was quite different. Specialization was not the rule. Most farms had a flock of chickens, a team of horses, one or more pigs, and 5 to 15 dairy cows. One in four farms had a flock of sheep; there were ducks and turkeys on 10 percent of the farms. Horses were the chief sources of both draft power on farms and transport to market. A quote from Bulletin Number 295 gives a sense of the times:

"The substitution of horse power for man power is the most striking feature of American agriculture. One horse properly directed can do the work of ten men. According to the United States Census the area farmed per man has increased one-third in the past twenty years. This increase has been due to the use of more horses per team."
(p. 420)

In the succeeding 80 years, tremendous change has occurred as mechanization and scientific agriculture have become the rule. Between 1907 and 1937, farm numbers in the township decreased by 46 percent. Land in farms decreased by 40 percent and crop acres by 48 percent. In the aggregate, farming accounted for nearly half of the land in 1907 but only 28 percent by 1937. There was an important exodus from farming over those 30 years (Table 1).

Over these same 30 years, however, farm size in terms of total acres or crop acres per farm changed very little (Table 3). People left agriculture because earnings were small and other jobs provided better opportunities. Technology changed very little; horses provided most of the draft power; tractors and the gasoline engine were not yet major factors in commercial agriculture in Dryden.

Much of the least productive land, that had been brought into agriculture in the early 19th century by human power and the axe, now was rapidly returning to forest by natural processes.

Table 1. CHANGES IN LAND USE
Dryden Township, Tompkins County, New York

Year	Number of farm records	Total acres in farms*	Total crop acres	Percent of township land** in farms
		(acres)		(percent)
1907	206	27,200	14,200	47
1917	159	23,500	11,900	41
1927	118	17,900	8,500	31
1937	111	16,300	7,300	28
1947	70	13,400	6,100	23
1957	65	14,700	7,000	25
1967	51	14,200	6,700	24
1977	31	9,600	5,500	17
1987	21	7,600	5,400	13

* Comparisons are made for farms selling milk or dairy products from 1917 onwards. Other farms were in operation in each of the years with the equivalent of one full-time worker.

**Dryden area is approximately 58,000 acres.

By 1947, the mechanical revolution following World War II was in full sway. The number of farms and land in farms dropped by 36 percent and 18 percent, respectively, between 1937 and 1947. In the next two decades (1947-67), however, land in farms and total crop acres stabilized. Between 1967 and 1977, farm numbers and land in farms dropped sharply again. While numbers decreased once again between 1977 and 1987 the rate was much slower, particularly in total crop acres farmed. Total crop acres have remained much more stable since 1937 than have farm numbers and land in farms. Fewer businesses now farmed the most productive acres.

The Labor Force and Milk Cows

In 1907 there were no milking machines, no bulk tanks and no milk coolers except for springs, wells and tanks served by ice houses. Farmers with milk cows marketed milk in a variety of ways.

The largest farms sold milk that was shipped to New York City or retailed locally. Those with smaller herds made butter or separated cream for sale and fed skim milk to pigs or other livestock. Nearly every farm had dairy cows that were hand milked twice a day. Cow numbers and the aggregate number of workers in farming decreased rapidly between 1907 and 1927 (Table 2). At the same time, the average number of cows per farm and the number of workers per farm remained constant (Table 3). Agricultural technology was changing slowly during these years.

Table 2. CHANGES IN DAIRY AND LABOR EFFICIENCY
Dryden Township, Tompkins County, New York

Year	Labor force	Number of milk cows	Milk sold	Milk sold per worker
	<u>worker years</u>		<u>million lbs.</u>	<u>pounds</u>
1907	350	2,265	*	*
1917	286	1,600	7.2	25,200
1927	212	1,180	7.0	33,000
1937	200	1,550	8.9	44,500
1947	140	1,750	11.9	85,000
1957	124	2,275	19.6	158,000
1967	97	2,450	27.8	286,000
1977	64	1,775	22.1	356,000
1987	49	1,570	24.5	498,000

The ups and downs of the dairy industry in Dryden during the 80 years is also interesting. Cow numbers were cut in half between 1907 and 1927. Total milk production held relatively constant as the quality of cows and methods of feeding improved on the surviving farms. More farms left agriculture in this 20-year span than in any subsequent period. By 1937, cow numbers had increased and milking machines and rural electrification was more common.

By 1947, the shift to much more specialized dairy farming was well under way. While most farms still had a flock of chickens, most of the pigs and sheep had disappeared. The horses were largely replaced by tractors. The dairy enterprise was the center of the business. Cow numbers reached a peak in 1967 as did total milk sales. There was an important decrease in both cows and total milk between 1967 and 1977. In the most recent ten-year period, cow numbers dropped again but increases in milk per cow and per worker more than made up the difference so that total sales increased.

In the aggregate, it is useful to note the steady increase in milk sold per worker for each of the decades. The gains in the earlier years were modest when compared to more recent times. Nevertheless, they were made with only modest increases in mechanization and technology. The recent gains in labor efficiency are impressive by nearly any standard. A relatively small number of workers in the township produce enough milk annually to feed 45,000 Americans at average consumption levels for fluid milk and all forms of dairy products.

Change in Size of Business

Farm size in terms of acres and crop acres per farm held steady between 1907 and 1937. The shift toward larger farms became more evident in 1947 but the greatest absolute changes have occurred in recent decades. Average herd size was 25 in 1947 and increased to 35 in 1957 with no increase in the number of workers. The installation of gutter cleaners and the use of milking machines, pipelines, and dumping stations made a major difference in labor efficiency. Further gains were realized between 1957 and 1967 with no additional labor.

Table 3. AVERAGE SIZE OF BUSINESS
Dryden Township, Tompkins County, New York

Year	Total acres	Crop acres	Number cows	Worker equivalent	Average capital
<u>- per farm -</u>					
1907	132	69	11	1.7	\$ 6,365
1917	148	75	10	1.8	10,290
1927	152	72	10	1.8	10,700
1937	147	66	14	1.8	9,400
1947	191	76	25	2.0	23,100
1957	226	107	35	1.9	46,000
1967	278	131	48	1.9	87,000
1977	300	178	57	2.0	248,000
1987	359	259	75	2.3	545,000

Between 1977 and 1987, average herd size jumped to 75 cows with a wide range around that average. The smallest farm had 33 cows and the largest 270 in 1987. Most operations had between 50 and 100 milking cows. In 1977, there were an average of 178 crop acres together with 57 cows or 3.1 crop acres per cow. In 1987, the crop

acres had been increased to 3.45 per cow, perhaps an indication that these dairymen were seeking to provide a larger proportion of their total nutrient requirements for milk production from their own crop production.

Sources of Labor

Most of the labor used in dairy farming in Dryden is provided by farm operators and their families. Over all of the years covered by these ten-year studies, the pattern has remained the same. In 1907, farmers hired 31 percent of their labor requirements; by 1947, the hired labor made up 32 percent of the total. In 1987, the hired component was up to 33 percent of the total, essentially no change.

Table 4. AVERAGE FARM LABOR FORCE
Dryden Township, Tompkins County, New York

Year	Operators	Unpaid family	Hired	Total
		<u>months</u>		
1907	12.0	2.0	6.4	20.4
1917	12.0	4.5	5.2	21.7
1927	12.0	4.9	4.6	21.5
1937	12.0	3.9	5.8	21.7
1947	12.0	4.1	7.6	23.7
1957	13.7	3.1	6.1	22.9
1967	14.3	2.6	5.6	22.5
1977	15.7	2.5	6.4	24.6
1987	16.4	2.4	9.3	28.1

In the earlier years, the typical farm had one full-time operator, some family help and hired labor particularly in the summer. Most of the larger farms before World War II would have had a full-time hired man. As farms got larger, it was more common to have partnerships or two full-time operators on part of the farms. The steady increase in this type of situation is reflected in the first column of Table 4. The decreasing importance of unpaid family labor is also evident in the second column.

Rates of Production

Rates of production both for livestock and for crops held quite steady between 1907 and 1937 (Table 5). Given that the number of farms decreased by such a large number between 1907 and 1927, it is

somewhat surprising that crop yields did not show more progress as many of the hill farms went out of production during these years. Regular applications of commercial fertilizer, hybrid seed and improved varieties helped to boost production from 1947 onward.

Table 5. AVERAGE RATES OF PRODUCTION
Dryden Township, Tompkins County, New York

Year	Milk sold per cow	Corn silage per acre	Hay equivalent per acre	Milk sold per worker
	<u>pounds</u>	<u>tons</u>	<u>tons</u>	<u>pounds</u>
1907	--	9.4	1.3	--
1917	4,400	7.6	1.2	25,000
1927	5,700	9.2	1.3	33,000
1937	5,700	8.7	1.5	44,500
1947	6,900	9.0	2.1	85,000
1957	8,500	10.7	2.5	158,000
1967	11,300	17.8	2.5	286,000
1977	12,500	13.4	2.4	356,000
1987	15,600	16.0	2.9	498,000

Hay and corn silage yields have increased substantially in the postwar years. Nevertheless, the rates of increase have generally been less than those achieved by the dairy herds. Weather in the year a record is taken, always affects crop yields more than milk per cow. The increases in hay yields have been accomplished in part by early harvest of first cutting as hay crop silage on many farms.

One way to get perspective on recent changes in efficiency and productivity in Dryden is to compare rates of performance with those of farmers cooperating in the statewide Dairy Farm Business Summary. Cooperators in the DFBS project are generally thought to be above average farmers. Historically, their rates of production have exceeded state averages for milk sold per cow.

Herd size in Dryden has not increased as rapidly as the average of DFBS cooperators. Nearly all active dairy farmers have provided records in Dryden in contrast to the self selected sample for DFBS. Of somewhat greater interest are the comparisons of cows per worker. Here the similarities are very great. Essentially the same forces of technology and increased productivity have led to these very similar results. Between 1977 and 1987, the increase in cows per worker has been modest in both sets of records.

The increases in milk sold per cow between 1957 and 1987 for the two groups are of similar magnitude. In each of these years, the Dryden averages were above state averages by approximately similar percentages and a little below the levels of the DFBS farms. The comparisons for milk sold per worker also reflect similar trends with big percentage increases between 1957 and 1967, less of a gain between 1967 and 1977, and then another sharp boost between 1977 and 1987.

Table 6. COMPARISON OF DRYDEN AVERAGES
WITH STATE BUSINESS (SUMMARY AVERAGES)
1957-1987

Year	<u>Cows per Farm</u>		<u>Milk sold per cow</u>	
	Dryden	DFBS	Dryden	DFBS
1957	35	33	8,500	8,900
1967	48	51	11,300	12,100
1977	57	71	12,500	13,600
1987	75	101	15,600	16,300

Year	<u>Cows per Worker</u>		<u>Milk sold per worker</u>	
	Dryden	DFBS	Dryden	DFBS
1957	18	18	158,000	163,000
1967	25	27	286,000	324,000
1977	29	28	356,000	386,000
1987	32	32	498,000	517,000

DFBS = New York Dairy Farm Business Summary published annually by the Department of Agricultural Economics.

In many respects, the nature of change in dairy farming in the township of Dryden mirrors what has occurred across the State and the Northeast. While it can only tell in detail what has occurred within a small area of land, experience in Dryden township continues to be surprisingly representative of the larger economic and social forces bringing about change in dairy farming along with technology.

Changes in Prices

To try to interpret what has happened over a span of 80 years to the financial side of dairy farming in Dryden, it is necessary to look at the major changes which have occurred in price levels during these years. No index of prices can reflect all of these changes; it can only suggest in part what has happened to the value of the dollar during the 20th century.

Between 1907 and 1917, prices nearly doubled associated with the economic ferment of World War I. The period from 1910-14 has sometimes been referred to as the Golden Age of Agriculture. Certainly it was a time of rising prices for farm products and one of relative price stability for products which farmers purchased. After the war, prices received reached a peak in 1920 and for the next 14 years the price of farm land fell in real terms every year. An agricultural depression during the 1920s preceded the more general economic depression of the 1930s. By 1937, commodity prices were on their way up from the low point of 1933-34.

Table 7. INDEX NUMBERS OF PRODUCER PRICES
All Commodities, 1907-1987

Year	Producer prices, all commodities	
	(1967 = 100)	(1987 = 100)
1907	33.6	10.9
1917	60.7	19.8
1927	49.5	16.1
1937	44.9	14.6
1947	76.6	24.9
1957	93.3	30.4
1967	100.0	32.6
1977	194.2	63.2
1987	307.1	100.0

The economy boomed and prices rose rapidly between 1937 and 1947, an increase of 70 percent on the 1937 base. Prices rose from 2 to 5 percent per year in much of the 1950s and 1960s. Inflation became a major factor in the late 1970s and early 1980s as Table 7 suggests. Between 1907 and 1987, prices had increased a little more than nine times; hence, direct comparisons of receipts, expenses, and capital investment between decades are at best complex.

Capital Investment

One of the most important things which occurred in dairy farming in Dryden and the rest of the United States during the twentieth century was the substitution of capital for labor to increase productivity. The adoption of new technology in both crop and livestock farming required large capital investments. Most of this massive investment occurred between 1947 and 1987.

In the years before World War II, only modest amounts of investments were made in new technology and machine power. Real estate was the major item of farm capital in 1907 and its importance fell each decade thereafter until 1947 as a percent of the total. New investments in farm buildings became much more important with the advent of free stall housing, milking parlors and around the barn pipeline systems in the late 1950s and 1960s. Real estate in 1987 made up 63 percent of total capital; included in that total in each of the years was an approximation of the value of cropland rented from others.

Table 8. DISTRIBUTION OF CAPITAL INVESTMENT
Dryden Township, Tompkins County, New York

Year	Real estate	Livestock	Machinery, equipment	Feed, supplies	Total investment
<u>- percent of total -</u>					
1907	73	17	7	3	\$ 6,365
1917	71	19	7	3	10,290
1927	68	21	8	3	10,700
1937	64	23	11	2	9,400
1947	45	37	17	1	23,100
1957	49	28	21	2	46,000
1967	49	27	18	6	87,000
1977	55	22	17	6	248,000
1987	63	18	14	5	545,000

Investments in livestock as a percent of total capital reached a peak in 1947. At that time, land was valued conservatively and demand for cows was substantial. Capital invested in machinery and equipment as a percent of the total peaked in 1957, a time when nearly all farms had electricity, tractors and a complement of machines to go with them.

A combination of increased size, in terms of land and cows, and much more capital investment per worker explains the twelvefold increase in capital investment reported between 1957 and 1987. Part of this is prices which increased more than 3.3 times in those 30 years. Commercial dairy farming is a capital intensive industry by any standards. The average capital investment per worker in Dryden in 1987 was more than \$230,000, part of which included rented as well as owned land. The average capital requirement per cow was over \$7000, somewhat above the average of \$5800 per cow reported in the DFBS summary, but which did not include an estimate of the value of rented land. If this were added, the equivalent DFBS average would amount to \$6,800-6,900 per cow.

Suburban Influences on Real Estate Values

The writer was a college student enumerator for the 1947 Dryden survey and has observed some of the changing character of the Dryden community in the ensuing years. Particularly in the nearly 20 years since the Tompkins Cortland Community College was located just north of the village limits, Dryden has been viewed as a more and more attractive place in which to live. This is reflected in real rates of growth in the prices of both houses and land. The value of farm land in this setting cannot escape the influence of speculation about future suburban development even if the most likely use of that land in the next 20 to 30 years is for forage crops. This influence is reflected in the capital investment figures for both 1977 and 1987 and is likely to continue.

Farm Receipts

The commercialization of agriculture is readily evident in looking at the amount of receipts that farmers handled from decade to decade especially before and after World War II. In many respects, farmers produced first to feed their own family in 1907 and then sold whatever surplus they had to buy the things they needed to farm and meet family needs. Between 1907 and 1937, general farming became less important and crop sales became a smaller and smaller part of the total (Table 9). During those years, cash receipts remained relatively small.

Table 9.

TOTAL RECEIPTS PER FARM Dryden Township, Tompkins County, New York

Year	Total farm receipts	Percent of Total				Total
		Milk and dairy products	Livestock and livestock products*	Crop sales	All other	
1907	\$ 1,495	44	20	28	8	100
1917	2,580	47	22	18	13	100
1927	3,200	52	23	10	15	100
1937	3,000	58	22	7	13	100
1947	12,700	65	16	6	13	100
1957	20,700	68	11	1	20	100
1967	36,600	77	9	*	14	100
1977	84,970	88	8	*	4	100
1987	169,400	88	7	1	4	100

*Primarily dairy animals and calves after 1957.

The increasing reliance on milk sales to support business operations is clearly evident, especially when most of the livestock and livestock product sales after 1957 are recognized to come from cull cows and bob calves. Specialization reached its peak in 1977 when 96 percent of total receipts came from the dairy enterprise; this same result holds in 1987. The farm flock of chickens, so important to many farm women as the source of their grocery money in the 1930s and 1940s, were of little importance in 1957 and essentially gone from 1967 onward.

Farm Expenses

Expenditure patterns for farm inputs have changed in important ways during these 80 years. In 1907, the largest item of cash expense was hired labor, followed by purchased feed and real estate expenses (taxes, insurance, building repair, fencing, etc.). By 1937, purchased feed had become the biggest cash outlay, now followed by hired labor and machinery and equipment expenses. Real estate expenses were a less important component of the total.

After World War II, purchased feed reached its high point as a percentage of total expenses in 1947. In 1957, the biggest item was machinery and equipment expense which also held true in 1967. In both 1977 and 1987, purchased feed again returned as the largest expenditure category. Purchased feed was consistently the largest or next to largest item in each of the nine time periods.

If one adds together the percentages for hired labor expense and machinery and equipment expense, the totals consistently range between 36 and 42 percent between 1907 and 1967. This is another way of showing how capital was substituted for labor consistently during these years. In 1977 and again in 1987, the total for hired labor and machinery and equipment expense was about equal to the percentage going for purchased feed.

In overview, hired labor became a smaller item in total expenditures because capital investment provided a cheaper and more effective way to increase farm productivity. Machinery and equipment expense increased accordingly until 1957. Buying concentrate feed continues to be the accepted way of providing an important part of dairy nutrients in the least expensive manner.

If one examines farm expenses as a ratio of receipts, this value is 0.44 in 1907, the smallest such figure during the years of this analysis. In contrast, the ratio is 0.78 in both 1977 and 1987. By 1927, this ratio had already reached 0.65 reflecting both narrowing margins from difficult economic conditions and the growing reliance on purchased inputs associated with specialization of production.

Table 10.

BUSINESS EXPENSES PER FARM
Dryden Township, Tompkins County, New York

Year	Total expenses	Percent of Total					
		Feed	Hired Labor	Machinery, equipment expense	Crops	Real estate	All other
1907	\$ 660	24	34	7	7	16	12
1917	1,480	27	28	9	7	12	17
1927	2,090	22	24	13	6	15	20
1937	2,320	27	19	17	7	13	17
1947	9,250	34	17	21	6	10	12
1957	14,300	22	11	31	9	14	13
1967	26,000	27	10	29	8	10	16
1977	66,100	32	11	20	10	11	16
1987	132,300	28	10	19	9	15	19

Labor Incomes

Labor incomes have been calculated directly or estimated indirectly in each of the years these records have been obtained. Labor income is a measure of the return to the operators' labor and management after deducting a charge for unpaid family labor and a charge for the use of all the capital used in the business. In most of the years of these studies, interest on total farm capital was charged at a rate of five percent (Table 11).

One of the more interesting comparisons to make in Table 11 is the relationship between interest on capital investment and labor income. In the first three periods including 1927, labor income exceeded interest on farm capital. In the bleak depression year of 1937, it did not. Again in 1947, 1957 and 1967, labor income was larger than interest on farm capital. In both 1977 and 1987, the reverse was true. In 1987, following current practice, cash interest paid on real estate debt was treated as a cash expense and included as a part of real estate expense in preparing Table 10. Cash interest paid on short term debt was charged as a cash expense and is part of "all other" in the calculations in Table 10. Interest on all farm capital at five percent would have amounted to \$27,250. In estimating labor income, only equity capital was charged at five percent because cash rent is paid for the use of rented land and interest rates on borrowed capital is substantially more than five percent.

The important point is that the returns to equity capital, operator's labor and management in both 1977 and 1987 are not equal to market rates. The average farm family must live, in part, on the

return to their equity capital as well as on their return to labor and management reported as "labor income." One reason why labor income in both 1987 and 1977 is relatively low compared to 1967 and 1957, when the rate of inflation is taken into account, is because real estate values had increased reflecting suburban influences.

One of the important sources of "long run" family income for many farm families, including many in Dryden is capital appreciation. This appreciation in capital value does not help to pay family bills or annual farm expenses. Yet, it is an important component of net worth and "long term income" even though unrealized in any given year. In both 1977 and 1987, capital appreciation on real estate was not included in estimating labor income. Increasingly farmers, like other businessmen, calculate this change in net worth along with their bankers. Until property is sold, net cash in hand remains small under average conditions. In a township like Dryden where suburban development pressure influences farm real estate values, interest on equity capital may well exceed labor income in 1997 for some of the same reasons that it did in 1987.

Table 11. AVERAGE LABOR INCOME PER FARM
Dryden Township, Tompkins County, New York

Year	Total receipts	Total expenses*	Farm income	Interest on capital @ 5%	Labor income
- per farm -					
1907	\$ 1,495	\$ 657	\$ 838	\$ 318	\$ 520
1917	2,584	1,478	1,106	514	592
1927	3,198	2,091	1,107	534	573
1937	3,004	2,323	681	472	209
1947	12,722	9,248	3,474	1,157	2,317
1957	20,702	14,343	6,359	2,300	4,059
1967	36,608	25,963	10,645	4,341	6,304
1977	84,970	74,650	10,320	12,400	-2,080
1987	169,400	143,780	25,620	18,250**	7,370

* Cash expenses, depreciation, and value of unpaid family labor, not including the operator.

**Interest on equity capital.

Direct Comparisons for 18 Farms, 1967 and 1987

For 18 of the 21 farms completing records in 1987, it was possible to identify the headquarters unit on which a farm record was obtained 20 years earlier in 1967. In two of the cases, two

similar sized farms from 1967 had been combined and were the major components of one farm in 1987. Thus, 20 units from 1967 are compared with 18 in 1987.

In 1967, these farms operated a total of 5,538.5 acres of which nearly 14 percent were obtained by cash renting cropland from other land owners. In 1987, the farms had increased in size and operated 7,143 acres of which more than 28 percent were cash rented. Interestingly, the land area owned had only increased by 359 acres. Most of the added land area had been gained by renting.

Table 12. LAND USE ON 18 CONTINUING FARMS
Dryden Township, Tompkins County, New York
1967 and 1987

Description	1967	1987
Number of farm units	20	18
Total acres owned	4,769	5,128
Acres rented	769.5	2,015
Total acres farmed	5,538.5	7,143
Percent of total rented	13.9%	28.2%
Percent of acres in study	39.0%	94.0%
Milk sold, lbs.	11,691,000	22,109,000

Only two of these 18 farms in 1987 were operated by individuals who were not either the same individual or a family member of the 1967 operator. Thus, of the 21 farm records in 1987, 16 were taken from either the same operator or from a member of his family who had operated a farm there in 1967. In 1987, only 2 of the 18 were not renting some cropland compared to 8 of 20 in 1967. One possible inference from these comparisons is that farmers have concluded that the most effective way to add cropland to an existing operation is by renting rather than buying under current land prices and rental rates. This approach to gaining the use of added cropland seems likely to continue into the 1990s.

Concluding Comment

Farming in Dryden township has gone through extraordinary change when viewed from the perspective of the late 1980s. The era of the horse has been replaced by the era of jets and microchips.

No doubt controls on a number of operations on some of the farms in 1997 will be made by computers. Automated milking systems will become more and more common. Crop production will no doubt be influenced further by new technology and greater automation. Capital per worker will continue to increase. Historic Dryden continues to be an especially interesting microcosm of change in the larger world around us offering insights both into the past and the future.

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