

CORNELL
AGRICULTURAL ECONOMICS
STAFF PAPER

COMPARISON OF FARM BUSINESSES OF
REGISTERED AND GRADE HERDS

New York, 1984

C. A. Bratton

C. B. Williams

November 1985

No. 85-34

Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York, 14853

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

Foreword

This publication is part of a study supported by a special temporary grant to the Agricultural Experiment Station at Cornell University by Agway Inc. of Syracuse, New York.

Dairy management practices are one area of factors that affect dairy farm incomes. Economic data on these practices are limited. Data available from the dairy herd improvement records and the New York farm business management projects were merged so as to make it possible to study the effects of dairy management practices on farm incomes.

The dairy herd improvement records classify the herds as either registered or grade. Since questions are often asked concerning the economics of maintaining a registered herd, it was decided to study these two groups in 1977. Each year since these comparisons have been made. In this report the information is available for 1984 with comparisons for 1977, 1980 and 1983.

This study provides economic data on registered and grade herds which can be used in determining policy recommendations in New York State; by individual farmers to compare their performance with the norm; and for showing basic trends in dairy management practices, incomes, and related business factors.

TABLE OF CONTENTS

	<u>Page</u>
Foreword	i
INTRODUCTION	1
The Situation	1
Study Procedures	1
SUMMARY OF FARM BUSINESSES	2
Business Characteristics	2
Farm Inventory Values	4
Receipts	6
Expenses	7
Financial Summary of Year's Business	10
Farm Family Financial Situation	12
ANALYSIS OF THE FARM BUSINESS	14
Business Factors	14
Dairy Practices	16
Farm Business Summary for Registered Herds, 1984	19
Farm Business Summary for Grade Herds, 1984	20

COMPARISON OF FARM BUSINESSES
OF REGISTERED AND GRADE HERDS
New York, 1984

C. A. Bratton and C. B. Williams*

Introduction

The Situation

A herd management practice of interest to dairy farmers is that of registered versus grade herds. Farmers often ask if it pays to maintain a registered herd. One approach used to answer management questions of this kind is to observe the experiences of farmers. We can observe the relative profitableness of farms with registered herds and those with grade herds. An analysis of the businesses also shows where and how the two types of herds may differ.

Since 1974 DHI information, when available, has been merged with the farm business financial data of the cooperators in the dairy farm business management projects. This makes it possible to study the effects of dairy herd management practices on the income from the business. For 1984 there were 327 farms for which both DHI and farm business financial data were available.

Dairy herd improvement records classify the herds as registered or grades. Some herds have both registered and grade animals but they are classified according to which predominates. The 327 farms on which combined data were available were sorted on the basis of registered or grade herds and averages for each were computed. The results are presented in a similar format to that used in the annual farm business summary reports.

Study Procedures

A computer listing was made of the farm business summary cooperators who indicated they had dairy herd improvement records. Then the dairy herd improvement identification numbers for these farms were obtained from the Animal Science Department. Farms with both kinds of records were determined for use in the study.

Once farms from the two sources were definitely identified and matched, the DHI information selected for analysis was merged with the farm business summary information. A computer program sorted the data into various groupings, and average values for all factors in each group were printed out. Comparative data for the registered and grade herds were put in cross tabulation tables and are reported in this publication.

* Emeritus Professor and Research Assistant respectively.

Summary of Farm Businesses

Business Characteristics

A knowledge of the farm resources used and the business characteristics is important in evaluating management performance. The table below shows important farm business characteristics for the two groups of farms.

Table 1. BUSINESS CHARACTERISTICS OF REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

<u>Number of farms reporting</u>					
<u>Type of Business</u>	<u>Registered</u>	<u>Grade</u>	<u>Business Records</u>	<u>Registered</u>	<u>Grade</u>
Individual	80	155	Account book	38	84
Partnership	29	51	Agrifax	33	49
Corporation	5	7	CAMIS	20	27
			Agway	6	11
<u>Barn Type</u>			Farm Bureau	0	3
Stanchion	77	106	Other	17	39
Free Stall	30	96			
Other	7	11	<u>Dairy Records</u>		
<u>Milking System</u>			D.H.I.C.	110	171
Bucket and carry	0	2	Owner Sampler	4	42
Dumping station	12	19			
Pipeline	69	98			
Herringbone	28	81			
Other parlor	5	13			
<u>Averages of farms reporting</u>					
<u>Labor Force</u>	<u>Registered</u>	<u>Grade</u>	<u>Land Used</u>	<u>Registered</u>	<u>Grade</u>
Operator(s)	16 mo.	16 mo.	Total acres:		
Family paid	4 mo.	5 mo.	Owned	336	348
Family unpaid	4 mo.	3 mo.	Rented	102	126
Hired	11 mo.	15 mo.	Crop acres:		
Total months	35 mo.	39 mo.	Rented	78	101
			Total	248	299
<u>Operators</u>	158	292	<u>Number of Cows</u>		
Age	43 yrs.	42 yrs.	Beg. of year	83	97
Estimated value			End of year	83	98
labor & management	\$16,597	\$16,056	Av. for year	83	96

There were 114 registered and 213 grade herds or nearly twice as many grade as registered herds in this group of 327 farms. A study of the business characteristics shows some interesting comparisons.

Business characteristics of the two groups for the years 1977, 1980 and 1983 are shown in table 2. The proportion of farms in each group remained about the same. Changes in characteristics tended to be similar for the registered and the grade herds.

Table 2. BUSINESS CHARACTERISTICS OF REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980, and 1983

Characteristic	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Number of farms	123	240	127	256	125	230
Type of business						
Individual	99	196	100	209	88	170
Partnership	20	41	24	41	33	57
Corporation	4	3	3	6	4	3
Barn type						
Stanchion	86	148	89	156	83	132
Free Stall	36	90	32	92	33	94
Other	1	2	6	8	9	4
Milking system						
Bucket & carry	2	3	1	2	1	2
Dumping station	29	76	18	55	13	19
Pipeline	62	80	81	114	75	112
Herringbone	26	70	21	76	32	83
Other parlor	4	11	6	9	4	14
Business records						
Account book	49	108	51	119	40	90
Agrifax	18	46	31	57	33	55
CAMIS	37	50	23	34	23	29
Agway	4	13	12	21	10	17
Farm Bureau	4	5	3	6	0	2
Other	11	18	7	19	19	37
Dairy records						
D.H.I.C.	116	189	125	214	121	181
Owner Sampler	7	51	2	42	4	49
<u>Averages of farms reporting</u>						
Labor force						
Operator(s)	15 mo.	14 mo.	15 mo.	15 mo.	15 mo.	16 mo.
Family paid	3 mo.	3 mo.	4 mo.	4 mo.	4 mo.	4 mo.
Family unpaid	3 mo.	3 mo.	3 mo.	3 mo.	4 mo.	3 mo.
Hired	8 mo.	9 mo.	9 mo.	10 mo.	10 mo.	14 mo.
Total months	29 mo.	29 mo.	31 mo.	32 mo.	33 mo.	37 mo.
Operators						
Age	43	42	41	38	43	41
Labor & management estimated value	\$11,600	\$12,100	\$14,400	\$14,400	\$15,600	\$15,800
Land used						
Total acres:						
Owned	286	306	287	315	327	327
Rented	84	95	104	130	119	147
Crop acres:						
Rented	66	71	90	107	97	120
Total	202	216	215	247	241	285
Number of cows						
Beg of year	66	71	66	74	81	90
End of year	67	72	69	76	83	93
Av. for year	66	70	66	74	82	91

Farm Inventory Values

Total 1984 farm inventory values as established by the farmers averaged about \$500,000 or half a million dollars for both the registered and grade herds (table 3). The characteristics of these farm inventory values are shown below.

Table 3. FARM INVENTORY VALUES BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Item	Registered		Grade	
	1/1/84	1/1/85	1/1/84	1/1/85
Livestock	\$129,064	\$128,884	\$121,289	\$120,196
Feed & supplies	36,967	39,010	41,333	43,967
Machinery & equipment	92,338	95,856	99,920	101,996
Land & buildings	236,728	242,836	253,780	260,406
Total	\$495,097	\$506,586	\$516,322	\$526,565

There was little difference in the 1984 total inventory per farm for registered and grade herds. The total investment per cow was higher for the registered than for the grade herds (\$6,104 vs. \$5,373). This may be explained in part by the difference in numbers of cows for the two groups (83 vs. 98).

The average end of year inventory per cow for all livestock was \$1,553 for the registered herds and \$1,226 for the grades. This can be explained in part by the higher proportion of heifers (92% vs. 84%). However, if it is assumed that average heifer values were one-half that of cows, the average value per cow equivalent would be \$1,065 for the registered and \$865 for the grades or \$200 more.

The farm inventory values for the years 1977, 1980 and 1983 are shown in table 5. The relationships were about the same for those years.

Table 4. LIVESTOCK INVENTORY VALUES PER COW BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, January 1, 1985

Item	Registered	Grade
Number of farms	114	213
Number of cows 1/1/85	83	98
% heifers are of cows	92%	84%
Inventory value per cow:		
All livestock	\$1,553	\$1,226
Per cow equivalent	\$1,065	865
Total farm inventory	\$6,104	\$5,373

Table 5. FARM INVENTORY VALUES BY REGISTERED AND GRADE HERDS
New York Dairy Farms, End of Year for 1977, 1980, and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Livestock	\$ 62,010	\$ 54,039	\$123,059	\$112,287	\$128,681	\$114,685
Feed & supplies	21,051	20,949	27,720	30,849	37,141	40,290
Machinery & equipment	55,290	55,367	75,676	76,536	89,999	96,067
Land & buildings	144,638	152,919	191,654	199,823	238,073	243,852
Total	\$282,989	\$283,274	\$418,109	\$419,495	\$493,894	\$494,894

Total farm inventory value per cow increased by 43% in registered herds and 40% in grade herds from 1977 to 1980, and both decreased by about 1% from 1980 to 1983. In 1977 total farm inventory value per cow was about \$300 higher in registered herds than in grades, in 1980 it was \$500 higher, in 1983 it was about \$600, and in 1984 about \$700. The difference tended to increase over time. Differences in the livestock inventory value per cow accounted for over half of the differences in total inventory values per cow.

Assuming that the value of heifers were one-half that of cows, then the average value per cow equivalent would be \$660 and \$550 in 1977, \$1,255 and \$1,080 in 1980, \$1,086 and \$910 in 1983, and \$1,065 and \$865 in 1984 for registered and grade herds respectively. From 1980 to 1984 livestock inventory values per cow equivalent decreased by about 15% in registered herds, and 20% in grade herds. Values of grade cattle declined somewhat faster than registered cattle.

Table 6. INVESTMENT PER COW BY REGISTERED AND GRADE HERDS
New York Dairy Farms 1977, 1980, and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Number of farms	123	240	127	256	125	230
Number of cows	67	72	69	76	82	90
% heifers are of cows	81%	73%	85%	74%	89%	80%
Inventory value/cow:						
All livestock	\$925	\$750	\$1,783	\$1,477	\$1,569	\$1,260
Per cow equivalent	\$660	\$550	\$1,255	\$1,080	\$1,086	\$910
Total farm inventory	\$4,222	\$3,934	\$6,060	\$5,519	\$6,023	\$5,439

Receipts

The farm receipts for the year show the general nature and size of the business. Below are the sources and average amounts of receipts for these 114 registered herds and 213 grade herds for 1984.

Table 7. FARM RECEIPTS BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Item	Registered		Grade	
	Amount	Percent	Amount	Percent
Milk sales	\$177,114	88	\$202,060	90
Crop sales	1,744	1	2,020	1
Dairy cattle sold	14,325	7	12,310	5
Calves & other livestock sales	2,302	1	3,082	1
Gas tax refunds	159	--	211	--
Government payments	2,268	1	3,679	2
Custom machine work	585	--	313	--
Other	3,038	2	3,448	1
Total cash receipts	\$201,535	100	\$227,123	100
Increase in livestock	2,091		2,759	
Increase in feed & supplies	2,043		2,634	
Livestock appreciation	- 2,271		- 3,852	
Machinery appreciation	5,498		4,146	
Real estate appreciation	6,000		6,317	
Total Farm Receipts	\$214,896		\$239,127	

Total cash receipts and total farm receipts were higher for the grade herds than for the registered. This is accounted for by the larger number of cows (83 vs. 96). Receipts from livestock sold, however, was larger for the registered herds and accounted for 7% of the cash receipts compared with 5% for the grade herds. This is probably a significant difference between the two kinds of herds.

The average price received for milk for the registered herds was \$13.56 compared with \$13.44 for the grade herds. The milk sales per cow were also higher for the registered herds. Dairy cattle sales per cow were higher for the registered herds.

Table 8. INCOME ANALYSIS BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Item	Registered	Grade
Average price/cwt. milk sold	\$13.56	\$13.44
Milk sales per cow	\$2,134	\$2,105
Dairy cattle sales per cow	\$173	\$128
Total cash receipts/cow	\$2,428	\$2,318

Expenses

Total farm expenses exceeded \$200,000 per farm for both types of herds. For both groups of farms feed, labor, and interest were the three largest cash expense items.

Table 9. FARM EXPENSES BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Item	Registered		Grade	
	Amount	Percent	Amount	Percent
Hired labor	\$ 17,195	10	\$ 21,347	11
<u>Feed</u>				
Dairy concentrate	42,841	26	50,436	27
Other feed	2,505	2	2,668	1
<u>Machinery</u>				
Machine hire	1,557	1	1,758	1
Machinery repairs	8,980	5	10,392	6
Auto expense (farm share)	411	--	486	--
Gas and oil	6,364	4	7,440	4
<u>Livestock</u>				
Replacement livestock	1,060	1	1,467	1
Breeding fees	3,559	2	2,834	2
Veterinary and medicine	3,761	2	4,421	2
Milk marketing	14,229	9	14,813	8
Other livestock expense	8,646	5	7,879	4
<u>Crops</u>				
Fertilizer and lime	8,262	5	10,041	5
Seeds and plants	2,792	2	3,297	2
Spray, other crop expense	2,645	2	3,038	2
<u>Real Estate</u>				
Land, building, fence repair	2,700	2	2,445	1
Taxes	4,570	3	4,828	3
Insurance	2,851	2	2,986	2
Rent	3,860	2	3,887	2
<u>Other</u>				
Telephone (farm share)	618	--	603	--
Electricity (farm share)	4,414	3	4,843	3
Interest paid	17,299	10	22,075	12
Miscellaneous	2,563	2	2,320	1
Total Cash Expenses	\$163,682	100	\$186,304	100
<u>Noncash Items</u>				
Expansion livestock	\$ 328		\$ 943	
Machinery depreciation	15,014		15,520	
Building depreciation	6,876		8,113	
Unpaid family labor	1,904		1,433	
Interest on equity capital @5%	17,962		16,137	
TOTAL FARM EXPENSES	\$205,766		\$228,450	
Total farm expense/cow	\$2,479		\$2,380	

Receipts

Trends in the farm receipts for registered and grade herds can be observed in tables 10 and 11 below.

Table 10. FARM RECEIPTS BY REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980 and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Milk sales	\$ 91,260	\$ 96,538	\$129,063	\$137,024	\$177,371	\$192,457
Crop sales	759	815	1,801	1,534	1,821	1,928
Dairy cattle sold	7,262	5,841	12,728	10,394	13,140	10,630
Other livestock sales	1,630	1,216	3,128	2,455	2,378	2,824
Gas tax refunds	147	153	133	123	214	158
Government payments	377	359	409	393	898	1,914
Custom work	180	207	235	185	330	360
Other	1,081	1,208	1,663	1,229	2,508	3,165
Total Cash Receipts	\$102,696	\$106,337	\$149,160	\$153,337	\$198,660	\$213,436
Inc. in livestock	3,551	3,105	5,710	4,690	4,121	3,835
Inc. in supplies	134	461	3,643	5,022	3,852	3,554
TOTAL FARM RECEIPTS	\$106,381	\$109,903	\$158,513	\$163,049	\$206,633	\$220,825

Total farm receipts were higher for the grade herds than for registered herds in 1977, 1980, 1983 and 1984. Average herd size for grade herds was higher than for registered herds in all years, this accounts in part for the larger total farm receipts in the grade herds. Total milk sales increased over the period with the grade herds selling more than the registered herds. Receipts from dairy cattle sold were higher for the registered herds. Dairy cattle sales increased by 75% and 78% in registered and grade herds respectively from 1977 to 1980. From 1980 to 1984 the increase was 13% for registered and 18% for grade herds.

Average price received per cwt. milk sold was slightly higher for registered than for grade herds in all years reported. Milk sales per cow also were higher in registered herds with a difference of \$104 in 1980, but this dropped to \$29 in 1984. Dairy cattle sales per cow were higher for registered herds in all years reported with a difference of \$27 in 1977, \$47 in 1980, \$42 in 1983 and \$45 in 1984. The differences in the 1980's have been consistent.

Table 11. INCOME ANALYSIS BY REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980 and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Milk av. price/cwt.	\$9.78	\$9.74	\$12.79	\$12.78	\$13.70	\$13.61
Milk sales/cow	\$1,383	\$1,379	\$1,956	\$1,852	\$2,163	\$2,115
Dairy cattle sales/cow	\$108	\$81	\$184	\$137	\$160	\$118
TOTAL CASH RECEIPTS/COW	\$1,612	\$1,570	\$2,402	\$2,203	\$2,423	\$2,345

Expenses

Total farm expenses per farm were greater for the grade herds than the registered for the four years reported. The larger number of cows explains part of this. Total farm expenses per cow, however, were higher for registered herds in the four years reported.

Table 12. FARM EXPENSES BY REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980 and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Hired labor	\$ 7,331	\$ 8,268	\$ 10,661	\$ 11,208	\$ 15,536	\$ 18,374
<u>Feed</u>						
Dairy concentrate	26,036	28,605	35,526	38,522	44,548	47,891
Other feed	1,224	1,315	1,675	1,426	1,909	2,353
<u>Machinery</u>						
Machine hire	804	747	1,153	1,149	1,392	1,625
Machinery repairs	4,631	4,745	6,699	6,762	8,854	9,231
Auto expense (FS)	337	342	450	364	640	510
Gas & oil	2,939	2,936	5,395	5,737	6,164	7,120
<u>Livestock</u>						
Replacement animals	2,231	2,602	2,268	2,700	1,868	2,067
Breeding fees	1,526	1,165	2,267	1,537	3,430	2,418
Veterinary expense	1,832	1,620	2,779	2,621	4,161	3,888
Milk marketing	2,237	2,384	3,616	3,513	12,586	13,061
Other expenses	3,580	3,442	5,592	4,716	8,285	7,209
<u>Crops</u>						
Fertilizer & lime	4,340	4,960	6,632	6,892	7,581	9,623
Seeds & plants	1,476	1,512	2,002	2,056	2,532	3,020
Other expenses	1,292	1,408	1,744	1,651	2,584	2,956
<u>Real estate</u>						
Repairs	1,730	1,579	2,771	2,043	2,999	2,432
Taxes	2,552	2,613	3,309	3,183	4,642	4,710
Insurance	1,767	1,705	2,522	2,554	2,849	2,807
Rent	1,139	1,285	1,903	2,017	2,975	4,370
<u>Other</u>						
Telephone (FS)	385	370	487	477	650	575
Electricity (FS)	1,727	1,704	2,485	2,528	4,079	4,205
Interest paid	5,555	7,491	9,759	13,824	15,904	20,182
Miscellaneous	1,403	1,058	2,063	1,832	2,834	2,194
Total Cash Expenses	\$ 78,094	\$ 83,856	\$113,758	\$119,312	\$159,002	\$172,821
<u>Noncash items</u>						
Expansion livestock	--	--	768	1,292	695	955
Machinery deprec.	5,611	5,919	10,268	11,029	13,611	14,403
Building deprec.	2,669	2,684	4,265	4,510	7,165	6,797
Unpaid family labor	1,200	1,200	1,500	1,500	1,824	1,322
Int. on equity cap.	14,252	12,724	27,833	23,825	17,494	15,298
Total Farm Expenses	\$101,826	\$106,383	\$158,392	\$161,468	\$199,791	\$211,596
TOTAL FARM EXPENSES/COW	\$1,520	\$1,478	\$2,296	\$2,125	\$2,436	\$2,351

Financial Summary of Year's Business

The financial summary of the year's operation reflects the results of management. Researchers have developed a number of ways to measure the returns from a farm business. Seven measures are reported below.

Table 13. MEASURES OF FARM BUSINESS INCOMES
By Registered and Grade Herds
327 New York Dairy Farms, 1984

Measure	Registered	Grade
Net cash farm income:		
Per farm	\$37,853	\$40,819
Per cow	\$456	\$425
Labor and management income:		
Per operator	\$-73	\$3,080
Per cow	\$-1	\$42
Labor, management and ownership income:		
Per operator	\$20,370	\$20,314
Return on equity capital:		
Including real estate appreciation	1.1%	1.5%
Excluding real estate appreciation	-1.4%	-0.6%

Labor and management income per operator is a basic measure generally used in comparing farm businesses. This measures the return to the operator for his labor and management. It is an indication of how well the operator has been able to "put it all together" or in brief indicates his managerial ability. The other measures of farm business incomes used in table 13 reflect the relative returns as related to other features of the business.

The average 1984 labor and management income per operator was minus \$73 for the registered herds and plus \$3,080 for the grade herds. On a per cow basis the labor incomes were minus \$1 and \$42. For both measures the grade herds paid better than the registered herds.

In 1984 the labor, management and ownership income per operator was about the same for the registered and grade herds. This measures the return to the operator for all his inputs, i.e. his labor, equity capital, managerial ability, and any appreciation on assets owned.

Return on equity capital is computed since it is a common measure used in nonfarm businesses. It measures the return to capital when the estimated value of the operator's labor and management is subtracted from the returns leaving the residue as a return to capital. Return to capital in farm businesses traditionally has been low. When appreciation was excluded the return to farm equity capital was a minus. For both measures of return to equity capital in 1984 the grade herds had a slightly better return than the registered herds.

Table 14. MEASURES OF FARM BUSINESS INCOMES BY REGISTERED AND GRADE HERDS
New York Dairy Farms 1977, 1980, and 1983

Measure	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Net cash farm income:						
Per farm	\$24,602	\$22,481	\$35,402	\$34,025	\$39,658	\$40,615
Per cow	\$373	\$321	\$536	\$460	\$484	\$446
Labor & mgt. income:						
Per operator	\$3,688	\$2,914	\$98	\$1,285	\$5,345	\$6,939
Per cow	\$56	\$42	\$2	\$17	\$65	\$76
Labor, mgt. & ownership income per operator	\$18,113	\$17,026	\$40,935	\$41,612	\$14,726	\$16,855
Return on equity capital:						
Incl. real estate appreciation	4.0%	3.3%	9.8%	11.9%	-0.5%	0.4%
Excl. real estate appreciation	2.2%	1.0%	6.8%	7.8%	-1.4%	-1.2%

Net cash income per farm increased from 1977 to 1980 and there were only small differences between the registered and grade herds. From 1977 to 1980 the increase was 44% and 51%, and from 1980 to 1983 there was only a 12% and a 19% increase for the registered and grade herds. Net cash income per cow was higher in the registered herds and it increased from 1977 to 1980 but dropped in 1983 and again in 1984 for both types of herds.

Labor, management and ownership income was similar in both registered and grade herds, and it increased by over 100% from 1977 to 1980 then dropped sharply in 1983. Return on equity capital, both including and excluding real estate appreciation followed the same pattern. These results are mainly due to the changes in the livestock and real estate appreciation which was \$4,228, \$19,185, and \$-6,700, in 1977, 1980 and 1983 respectively for all the herds in the business summary for those years.

In 1977 all seven of the farm income measures observed in table 14 were slightly better for the registered herds than for the grade herds. In contrast for 1980, 1983 and 1984 the income measures for the grade herds were higher than for the registered. In all years the differences were relatively small.

Size of herd and capital efficiency are two factors that affect the various farm business income measures. Size is important in spreading fixed costs over more units while the greater the capital per productive unit the higher the interest costs charged to the business. In the four years studied the grade herds were larger and had lower capital investments per cow. These are reflected in the comparison of the various income measures shown above.

Farm Family Financial Situation

The financial situation is an important part of a farm business summary. It affects the current cash outflow and future capital investment decisions. A farmer may have a good labor income, but a high debt payment schedule may seriously restrict his management possibilities.

Table 15. FARM FAMILY FINANCIAL SITUATION BY REGISTERED AND GRADE HERDS
327 New York Dairy Farms, January 1, 1985

Item	Registered		Grade	
	Amount	Percent	Amount	Percent
<u>Assets</u>				
Livestock	\$128,917	24	\$120,196	21
Feed and supplies	39,010	7	43,967	8
Machinery and equipment	96,708	18	103,464	18
Land and buildings	244,770	46	262,077	47
Co-op investment	8,144	2	9,823	2
Accounts receivable	16,214	3	18,575	3
Cash and checking accounts	2,665	--	3,425	1
Total Farm Assets	\$536,428	100	\$561,527	100
Savings accounts	3,300		2,830	
Cash value life insurance	3,591		2,133	
Stocks and bonds	3,783		1,955	
Nonfarm real estate	7,025		4,654	
Auto (personal share)	1,648		1,808	
All other	7,515		6,456	
TOTAL ASSETS	\$563,290		\$581,363	
<u>Liabilities</u>				
Long term (mortgage, etc.)	\$ 99,052	56	\$135,602	57
Intermediate term	69,877	40	90,465	38
Short term	4,131	2	4,315	2
Other farm debt	4,122	2	8,401	3
Total Farm Liabilities	\$177,182	100	\$238,783	100
Nonfarm Liabilities	463		1,145	
TOTAL LIABILITIES	\$177,645		\$239,928	
Farm Net Worth (equity capital)	\$359,246		\$322,744	
Family Net Worth	\$385,645		\$341,435	
Percent Equity (total)	68%		59%	
Farm debt per cow	\$2,109		\$2,437	
Scheduled debt payments/cow	\$472		\$525	
Scheduled debt payments as % milk	22%		25%	
Cash available for debt payments	\$35,524		\$40,953	

The measures above suggest that the registered herds were in a somewhat better financial position than the grade herds. The same was true for the earlier years reported in table 16.

Table 16. FARM FAMILY FINANCIAL SITUATION BY REGISTERED AND GRADE HERDS
New York Dairy Herds, 1977, 1980, and 1983

Item	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Assets						
Livestock	\$ 62,010	\$ 54,040	\$123,059	\$112,287	\$128,740	\$114,841
Feed & supplies	21,051	20,949	27,720	30,849	37,141	40,290
Machinery & equipment	55,291	55,367	75,676	76,536	90,503	97,108
Land & buildings	144,638	152,919	191,654	199,823	238,949	246,283
Co-op investment	3,691	3,822	4,424	4,941	7,526	9,601
Accounts receivable	6,154	7,257	10,570	11,805	14,813	16,231
Bank accounts	1,484	1,941	3,048	2,221	1,948	2,491
Total Farm Assets	\$294,319	\$296,295	\$436,151	\$438,462	\$519,620	\$526,845
Savings accounts	3,310	2,961	3,394	2,734	3,019	2,744
Cash value life ins.	3,470	2,398	4,666	3,339	2,736	2,635
Stocks and bonds	3,416	1,739	3,737	2,677	3,846	2,370
Nonfarm real estate	1,974	2,376	6,037	5,879	6,334	5,392
Auto (personal share)	1,029	806	1,636	1,283	1,639	1,503
All other	3,307	1,287	7,746	5,651	6,901	7,200
TOTAL ASSETS	\$310,825	\$307,862	\$463,367	\$460,025	\$544,095	\$548,689
Liabilities						
Long term	\$ 52,707	\$ 64,128	\$ 72,845	\$100,285	\$100,842	\$122,962
Intermediate term	27,587	39,648	39,015	54,984	60,681	83,729
Short term	2,741	2,675	3,884	5,038	3,477	3,998
Other farm debt	7,686	8,072	11,146	13,428	4,738	10,191
Total Farm Liab.	\$ 90,721	\$114,523	\$126,890	\$173,735	\$169,738	\$220,880
Nonfarm Liab.	1,246	849	484	1,684	512	1,312
TOTAL LIABILITIES	\$ 91,967	\$115,372	\$127,374	\$175,419	\$170,250	\$222,192
Farm New Worth	\$203,598	\$181,772	\$309,261	\$264,727	\$349,882	\$305,965
Family Net Worth	\$218,858	\$192,490	\$335,993	\$284,606	\$373,845	\$326,497
Percent Equity (total)	70%	63%	73%	62%	69%	60%
Farm debt per cow	\$1,375	\$1,613	\$1,839	\$2,286	\$2,021	\$2,350
Scheduled debt payment:						
per cow	\$225	\$266	\$357	\$462	\$433	\$485
% milk sales	16%	20%	19%	26%	20%	24%
Cash available for debts	\$18,157	\$17,972	\$28,407	\$31,015	\$57,601	\$62,485

The trend in farm assets and farm liabilities was upward for both registered and grade herds from 1977 to 1984. Farm assets increased by 82% and 90%, farm liabilities by 95% and 109%, and farm net worth by 76% and 78% respectively for registered and grade herds.

Analysis of the Farm Business

Research has shown that certain factors controlled by management affect farm incomes. In analyzing a farm business, we examine the business factors of size, rates of production, labor efficiency, capital efficiency and cost control. For a dairy farm it is helpful to examine the dairy practices along with the business factors.

Business Factors

Table 17. AVERAGE OF BUSINESS FACTORS FOR REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Factor	Average	
	Registered	Grade
Number of farms	114	213
<u>Size</u>		
Worker equivalent	2.92	3.25
Number of cows	83	96
Number of heifers	76	81
Total crop acres	248	299
Total end inventory	\$506,586	\$526,565
<u>Rates of Production</u>		
Milk produced per cow	16,836	16,384
Milk sold per cow	15,737	15,657
Tons hay equivalent per acre	2.7	2.7
Tons corn silage per acre	14.5	14.1
<u>Labor Efficiency</u>		
Cows per person	28	30
Milk sold per person	447,000	462,000
<u>Capital Efficiency</u>		
Farm capital per worker	\$173,000	\$162,000
Farm capital per cow	\$6,000	\$5,400
Farm capital per cwt. milk	\$39	\$35
<u>Cost Control</u>		
Feed purchased per cow	\$516	\$525
% feed is of milk receipts	24%	25%
Labor cost/cwt. milk	\$2.38	\$2.31
Machine cost/cwt. milk	\$2.84	\$2.70
Veterinary and medicine/cow	\$45	\$46
Breeding expense/cow	\$43	\$30
Real estate expense per cow	\$168	\$147
TOTAL FARM EXPENSE PER COW	\$2,479	\$2,380

The registered herds had higher rates of production and lower feed costs than the grade herds while the grade herds were larger, had better labor efficiency, more efficient use of capital and generally better cost control.

Table 18. AVERAGE OF BUSINESS FACTORS FOR REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980, and 1983

Factor	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Number of farms	123	240	127	256	125	230
<u>Size factors</u>						
Man equivalents	2.4	2.4	2.6	2.7	2.8	3.1
Number of cows	66	70	66	74	82	91
Number of heifers	53	51	56	55	73	73
Total crop acres	202	216	215	247	241	285
Total farm inventory	\$282,989	\$283,274	\$418,109	\$419,495	\$493,894	\$494,894
<u>Rates of production</u>						
Milk produced/cow	14,895	14,762	16,254	15,549	16,921	16,318
Milk sold/cow	14,133	14,166	15,200	14,400	15,800	15,500
Tons hay equiv/acre	2.6	2.3	2.6	2.4	2.5	2.6
Tons corn silage/acre	14.9	13.9	15.0	14.4	14.0	13.3
<u>Labor efficiency</u>						
Cows per worker	27	29	26	28	30	30
Milk sold/worker	385,455	409,752	391,200	401,600	470,909	459,091
<u>Capital efficiency</u>						
Farm capital/worker	\$116,938	\$117,055	\$162,058	\$157,114	\$179,598	\$160,680
Farm capital/cow	4,288	4,047	6,060	5,520	6,023	5,438
Farm cap/cwt. milk	30	29	40	38	38	35
<u>Cost control</u>						
Feed purchased/cow	\$394	\$409	\$538	\$521	\$543	\$526
% feed of milk recpt.	29%	30%	28%	28%	25%	25%
Labor cost/cwt. milk	\$1.88	\$1.80	\$2.32	\$2.23	\$2.22	\$2.23
Mach. cost/cwt. milk	\$1.98	\$1.86	\$3.01	\$2.94	\$2.71	\$2.66
Vet. expense/cow	\$28	\$23	\$42	\$35	\$51	\$43
Breeding exp/cow	\$23	\$17	\$34	\$21	\$42	\$27
Real estate exp/cow	\$109	\$103	\$159	\$132	\$164	\$157
Total farm exp/cow	\$1,543	\$1,520	\$2,400	\$2,182	\$2,436	\$2,325

Trends in the business factors for the years 1977 to 1984 indicate the dynamic nature of the dairy industry. All measures of size increased from 1977 to 1984. Cow numbers in the registered herds increased 26% and in the grade herds 37%. Worker equivalents increased by 22% and 35%, and crop acres by 23% and 38% respectively for registered and grade herds.

Rates of production as shown by milk sold per cow increased 11% for both registered and grade herds. Crop yield increased relatively less than production per cow. Labor efficiency as measured by milk sold per worker increased by 16% and 13% while capital per cow increased by 40% and 33% respectively for the registered and grade herds. Capital as reflected in equipment affects labor efficiency.

Cost control is a key factor. Total farm expenses per cow increased by 61% and 57% respectively for registered and grade herds. Breeding expenses per cow increased by 87% and 76% respectively.

Dairy Practices

Much information on dairy practices is collected by the Dairy Herd Improvement record system. With the use of computers, a number of helpful management factors are calculated and made available to the farmer for use in making his dairy management decisions. These are reported on this page.

Table 19. AVERAGE OF DAIRY FACTORS FOR REGISTERED AND GRADE HERDS
327 New York Dairy Farms, 1984

Factor	Average	
	Registered	Grade
Number of farms	114	213
Feeding index	117	118
Rate of roughage feeding	2.4	2.4
Pounds concentrates fed/cow	5,568	5,360
% net energy from concentrates	44	44
% net energy from succulents	36	38
% net energy from hay	13	12
% net energy from pasture	7	5
Projected minimum calving interval (months)	13.0	12.7
Days dry	62	61
% days in milk	86	86
Breedings per conception	1.9	1.7
% leaving herd as culls	30%	33%
Age at first calving (months)	28	28
Age all cows (months)	52	50
Bodyweight all cows (lbs.)	1,290	1,240
Bodyweight at first calving (lbs.)	1,150	1,100
Income over value feed	\$1,388	\$1,325

Feeding practices for the registered and grade herds were similar but with some differences. The registered herds fed more pounds of concentrates per cow and depended a little more on dry hay and pasture for net energy than did the grade herds.

Breeding practices information showed the registered herds to have a longer minimum calving interval and more breedings per conception than the grade herds. The age at first calving was the same for both groups.

Percent leaving as culls was lower for the registered herd, but with more leaving as dairy cows than the grade herds. The registered herds were older (52 months vs 50) and the cows were larger than those in the grade herds.

Table 20. AVERAGE OF DAIRY FACTORS FOR REGISTERED AND GRADE HERDS
New York Dairy Farms, 1977, 1980, and 1983

Factor	1977		1980		1983	
	Registered	Grade	Registered	Grade	Registered	Grade
Number of farms	123	240	127	256	125	230
Feeding index	118	120	104	108	115	115
Rate of roughage feeding	2.3	2.3	1.9	2.0	2.2	2.2
Lbs. concentrate fed/cow	5,573	5,606	5,793	5,885	6,500	6,200
% net energy/concentrates	47	48	47	48	46	47
% net energy/succulents	32	33	32	33	36	37
% net energy from hay	13	13	14	13	12	12
% net energy from pasture	9	7	7	6	6	4
Calving interval (mo.)	12.9	13.0	13.1	13.0	13.1	13.0
Days dry	62	62	61	61	61	61
% days in milk	86	86	86	86	86	86
Breedings/conception	1.7	1.7	1.9	1.8	1.8	1.8
% leaving as culls	26	30	24	27	30	31
Age at 1st calving (mo.)	29	29	28	28	28	28
Age all cows (mo.)	55	54	53	53	52	50
Bodyweight all cows (lbs.)	1,250	1,230	1,280	1,250	1,280	1,240
Bodyweight 1st calving	1,080	1,070	1,120	1,100	1,120	1,100
Income over feed value	\$875	\$827	\$1,340	\$1,237	\$1,455	\$1,387

Except for some small differences the registered and grade herds were similar with respect to the dairy practices studied in 1977, 1980 and 1983. Pounds concentrates fed per cow was higher in the grade herds in 1977 and 1980, but lower in 1983 than the registered herds.

Percent of the herd leaving as culls was higher for the grade herds for all three years. The registered herds tended to have slightly heavier cows and a heavier bodyweight at first calving than the grade herds.

Income over feed cost was higher in the registered herds for all three years, and this agrees with the higher net cash income per cow in these herds.

Table 21. SELECTED DAIRY MANAGEMENT FACTORS FOR REGISTERED AND GRADE HERDS
327 New York State Dairy Farms, 1984

Factor	Registered	Grade
Number of farms	114	213
Fat test	3.70	3.63
Pounds fat produced per cow	619	594
Protein test	3.25	3.22
Pounds protein produced per cow	545	528
Value of concentrates fed per cow	\$494	\$509
Percent value of concentrates is of total feed value per cow	60%	61%
Value of feed per cwt. of milk	\$4.92	\$5.06
Pounds succulents fed per cow	15,629	17,228
Pounds dry roughages fed per cow	2,904	2,637
Percent of cows not bred after 100 days	3%	4%
Days open cows not bred	85	87
Days open all cows	104	105
Percent first calf cows entering herd	32%	31%
Percent other cows entering herd	2%	2%
Percent dairy cows leaving herd	4%	1%
Cow days in milk 3 times	672	5,282
Number of cows milked 3 times	44	191

When the project for merging DHI and farm business information was started in 1974 a number of the more commonly used dairy practices were selected for study. These have continued to be used and reported in the publications. However, interest was expressed in studying some of the other DHI factors so special work was done on a number of additional items for 1982, 1983 and 1984. The 1984 data for the registered and grade herds are shown in table 21.

A number of interesting differences are reported above. The registered herds had higher fat test, more pounds of fat produced per cow and more pounds of protein produced per cow than the grade herds. The value of feed per cwt. of milk produced was also lower for the registered than the grade herds. The grade herds fed more succulents but less dry hay than the registered herds.

Replacements were reported as either first calf heifers or other cows. The grade herds purchased more replacements than the registered herds. On the other hand the registered herds had a higher percent leaving as dairy cows than the grade herds.

Table 22.

FARM BUSINESS SUMMARY FOR REGISTERED HERDS
114 New York Dairy Farms, 1984

<u>CAPITAL INVESTMENT</u>			<u>RECEIPTS</u>	
	1/1/84	1/1/85		
Livestock	\$129,064	\$128,884	Milk sales	\$177,114
Feed & supplies	36,967	39,010	Crop sales	1,744
Machinery & equipment	92,338	95,856	Dairy cattle sold	14,325
Land & buildings	236,728	242,836	Livestock sales	2,302
TOTAL INVESTMENT	\$495,097	\$506,586	Gas tax refund	159
<u>EXPENSES</u>			Government payments	2,268
Labor			Machine work	585
Hired		\$ 17,195	Miscellaneous	3,038
Feed			TOTAL CASH RECEIPTS	\$201,535
Dairy concentrate		42,841	Increase in livestock	2,091
Hay and other		2,505	Increase in feed & supplies	2,043
Machinery			Livestock appreciation	- 2,271
Machine hire		1,557	Machinery appreciation	5,498
Machinery repair		8,980	Real estate appreciation	6,000
Auto expense		411	TOTAL FARM RECEIPTS	\$214,896
Gas and oil		6,364	<u>FINANCIAL SUMMARY</u>	
Livestock			Total cash receipts	\$201,535
Replacement animals		1,060	Total cash expenses	163,682
Breeding fees		3,559	NET FARM CASH FLOW	\$ 37,853
Veterinary, medicine		3,761	Total receipts (excl. apprec.)	\$205,669
Milk marketing		14,229	Total farm expenses	205,766
Other livestock expense		8,646	LABOR & MGT. INCOME/FARM	\$ - 97
Crops			Number of operators	1.33
Lime and fertilizer		8,262	LABOR & MGT. INCOME/OPERATOR	\$ - 73
Seeds and plants		2,792	<u>BUSINESS FACTORS</u>	
Spray and other		2,645	Worker equivalent	2.92
Real estate			Number of cows	83
Land, building, fence repair		2,700	Number of heifers	76
Taxes		4,570	Acres of hay crops	129
Insurance		2,851	Acres of corn silage	57
Rent		3,860	Total acres of crops	248
Other			Lbs. of milk sold	1,306,200
Telephone (farm share)		618	Lbs. of milk sold/cow	15,737
Electricity (farm share)		4,414	Tons hay crops/acre	2.7
Interest paid		17,299	Tons corn silage/acre	14.5
Miscellaneous		2,563	Lbs. of milk sold/worker	447,329
TOTAL CASH EXPENSES		\$163,682	Cows per worker	28
Expansion livestock		328	% feed is of milk sales	24%
Machinery depreciation		15,014	Feed & crop exp/cwt. milk	\$4.52
Building depreciation		6,876	Labor cost/cow	\$374
Unpaid labor		1,904	Machinery cost/cow	\$446
Interest on farm equity @ 5%		17,962	Av. price/cwt. milk	\$13.56
TOTAL FARM EXPENSES		\$205,766		

Table 23.

FARM BUSINESS SUMMARY FOR GRADE HERDS
213 New York Dairy Farms, 1984

<u>CAPITAL INVESTMENT</u>			<u>RECEIPTS</u>	
	<u>1/1/84</u>	<u>1/1/85</u>		
Livestock	\$121,289	\$120,196	Milk sales	\$202,060
Feed & supplies	41,333	43,967	Crop sales	2,020
Machinery & equipment	99,920	101,996	Dairy cattle sold	12,310
Land & buildings	253,780	260,406	Livestock sales	3,082
TOTAL INVESTMENT	\$516,322	\$526,565	Gas tax refund	211
<u>EXPENSES</u>			Government payments	3,679
<u>Labor</u>			Machine work	313
Hired		\$ 21,347	Miscellaneous	3,448
<u>Feed</u>			TOTAL CASH RECEIPTS	\$227,123
Dairy concentrate		50,436	Increase in livestock	2,759
Hay and other		2,668	Increase in feed & supplies	2,634
<u>Machinery</u>			Livestock appreciation	- 3,852
Machine hire		1,758	Machinery appreciation	4,146
Machinery repair		10,392	Real estate appreciation	6,317
Auto expense		486	TOTAL FARM RECEIPTS	\$239,127
Gas and oil		7,440	<u>FINANCIAL SUMMARY</u>	
<u>Livestock</u>			Total cash receipts	\$227,123
Replacement animals		1,467	Total cash expenses	186,304
Breeding fees		2,834	NET FARM CASH FLOW	\$ 40,819
Veterinary, medicine		4,421	Total receipts (excl. apprec.)	\$232,516
Milk marketing		14,813	Total farm expenses	228,450
Other livestock expense		7,879	LABOR & MGT. INCOME/FARM	\$ 4,066
<u>Crops</u>			Number of operators	1.32
Lime and fertilizer		10,041	LABOR & MGT. INCOME/OPERATOR	\$ 3,080
Seeds and plants		3,297	<u>BUSINESS FACTORS</u>	
Spray and other		3,038	Worker equivalent	3.25
<u>Real estate</u>			Number of cows	96
Land, building, fence repair		2,445	Number of heifers	81
Taxes		4,828	Acres of hay crops	147
Insurance		2,986	Acres of corn silage	79
Rent		3,887	Total acres of crops	299
<u>Other</u>			Lbs. of milk sold	1,503,100
Telephone (farm share)		603	Lbs. of milk sold/cow	15,657
Electricity (farm share)		4,843	Tons hay crops/acre	2.7
Interest paid		22,075	Tons corn silage/acre	14.1
Miscellaneous		2,320	Lbs. of milk sold/worker	462,492
TOTAL CASH EXPENSES		\$186,304	Cows per worker	30
Expansion livestock		943	% feed is of milk sales	25%
Machinery depreciation		15,520	Feed & crop exp/cwt. milk	\$4.62
Building depreciation		8,113	Lime & fertilizer/crop acre	\$34
Unpaid labor		1,433	Machinery cost/cow	\$423
Interest on farm equity @ 5%		16,137	Av. price/cwt. milk	\$13.44
TOTAL FARM EXPENSES		\$228,450		