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AN OVERVIEW OF THE 1987 FARM
MANAGEMENT AND ENERGY SURVEY

by

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Preface

This report provides a brief summary of the 1987 Farm Management and Energy Survey. The more extensive survey results are stored in computer files maintained by the Department of Agricultural Economics at Cornell University. Information on individual farms is confidential, but interested parties are encouraged to inquire about procedures for obtaining additional data summaries.

An Overview of the 1987 Farm Management and Energy Survey

by

Michael J. Kelleher and Nelson L. Bills*

Research on farm electrical use and equipment at Cornell University dates to the 1920s. There have been dramatic changes in farm structure and management practices used on farms in recent decades and adjustments are expected in the future. The Departments of Agricultural Economics and Agricultural Engineering at Cornell University are analyzing the use of electricity on farms under the research project "Future Directions for the Upstate New York Agricultural Economy with Special Reference to the Potential for Electrical Energy Conservation." The project is funded by the Niagara Mohawk Corporation.

Cornell and the New York Agricultural Statistics Service (NYASS) conducted the 1987 Farm Management and Energy Survey to assemble data on energy use and management practices. The survey was focused on Upstate farms with \$10,000 or more of gross receipts during the 1986 calendar year. This approach excludes many small part-time farms and farms located on Long Island and suburban New York City (figure 1). NYASS enumerators contacted 1,800 farm operators during April and May 1987; 74 percent of these operators supplied information on energy use and management practices.

Electric Expense and Equipment

Farm operators reported total 1986 electric expense for the farm business and the farm household. Poultry farms averaged \$11,000 in

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electric expense (table 1). This amount is larger than other farm types because of the relatively large ventilation, lighting, and materials handling electrical loads on modern poultry farms. Vegetable, dairy, and horticultural farms also report substantial electric expense. Grape and general livestock farms report the lowest electric expense with an average of \$800 and \$1,300, respectively. Despite the wide range in expense per farm, outlays for electric energy are a relatively minor expense for New York farmers. Electric expense falls in the range of 1 to 4 percent of gross receipts across farm type.

Table 1. Total electric expense by type of farm for Upstate New York, 1986^a

	Electric expense
Cash crop	\$ 1,900
Dairy	4,200
General livestock	1,300
Grape	800
Horticulture	3,100
Poultry	11,000
Tree fruit	2,100
Vegetable	4,300
All farms	\$ 3,800

^aTotal electric expense includes both farm and household share on those farms with one or more residences on the farm meter.

Farm Electrical Equipment

Major electrical equipment items were inventoried on each farm (table 2). Air compressors, electric welders, and tractor block heaters are common items on farms, regardless of farm enterprise. At the other extreme, roller mills, electric blowers, and alley scrapers are more specialized items tailored to power requirements on only a few farms. Ventilation fans (including those used in crop storage facilities) occur

Table 2. Electric equipment on farms in Upstate New York, 1986

Item	Percent of farms reporting									
	Cash crop	Vegetable	Horticulture	Grape	Tree fruit	Dairy	Poultry	General livestock		
Silo unloaders	4	8	1	2	*	73	36	16		
Augers/elevators	58	16	1	19	12	69	79	31		
Hammer mill	2	*	*	*	*	2	24	*		
Roller mill	5	4	*	*	*	15	10	4		
Electric feeder	1	*	1	*	*	13	42	14		
Electric blower	4	4	9	*	*	*	3	*		
Hay dryer	1	*	*	*	*	7	*	*		
Grain dryer	42	7	1	8	7	2	26	9		
Feeding cart	6	*	*	*	*	5	17	*		
Gutter cleaner	12	6	*	*	*	80	50	7		
Alley scraper	*	*	*	*	*	1	20	*		
Ventilation fan	30	35	76	9	51	89	94	22		
Electric heater	11	26	5	16	15	31	51	15		
Tractor block heater	69	39	18	20	70	82	71	42		
Air compressor	93	68	51	67	73	86	95	82		
Electric welder	77	53	37	67	62	75	75	59		

*Less than 1 percent.

frequently on all types of farms, except grape farms. Feed and manure handling equipment were most common to livestock farms. The occurrence of silo unloaders and grain dryers on grape or vegetable farms can be explained by the occurrence of multiple enterprises on many farms.

Pipelines are the most commonly used milking systems on dairy farms (46 percent) (table 3). Bucket milkers are used on 34 percent of all dairy farms, while 20 percent use milking parlors. Parlors are more common on dairy farms in the Western Plains and in Eastern New York, occurring on 29 and 27 percent of the dairy farms, respectively. Dairy farms in the Northern and Southern Tier regions more frequently use traditional pipeline and bucket milking systems. Electric conserving milk precoolers and cost reducing in-line coolers were present on 11 percent and 2 percent of dairy farms, respectively (table 3).

Total farm electrical lighting loads were disaggregated by type of farm (table 4). Poultry and horticultural farms reported the largest

Table 3. Electrical equipment for milk handling on dairy farms by region, 1986^a

Item	All	Southern Tier	Western Plains	Eastern	Northern
	- - - Percent of farms reporting - - -				
Parlor	20	17	29	26	12
Pipeline	46	49	32	55	51
Bucket milkers	34	34	39	18	37
Precooler	11	10	15	14	8
In-line cooler	2	2	1	3	3
Vacuum pump	98	97	99	95	98
Bulk tank	98	96	100	95	100
Milk transfer pump	65	71	64	65	62

^aSee Figure 1 for description of regions.

Table 4. Major electrical lighting loads by type of farm, Upstate New York, 1986

Farm type	Total wattage per farm
Cash crop	1,400
Dairy	2,940
General livestock	1,670
Grape	880
Horticulture	5,040
Poultry	8,210
Tree fruit	2,090
Vegetable	2,110
All	2,790

lighting loads, with 8,210 and 5,040 total wattage, respectively. Grape farms and cash crop farms had the smallest lighting loads.

Energy Use in Farm Households

Detailed information on type and frequency of electrical appliances and conservation measures is summarized in tables 5 through 8. Farm operators predominantly reside in older, single family homes. Forced hot air, hot water, and wood and coal stoves are the most common heating systems (table 5). Oil and wood are the most common primary heating fuels, while electricity is the dominant fuel used for heating hot water and cooking in farm households (table 6). Refrigerators, clothes washers, clothes dryers and color televisions are the most common electric appliances in the farm household (table 7). Personal computers and waterbed heaters are the least common electrical items in farm households. Farm households make varying use of measures known to conserve on the use of electric energy. Wall and ceiling insulation are the most frequent conservation measures currently installed in farm residences (table 8). However, several low-cost

Table 5. Type of heating system used in farm households, Upstate New York, 1986

Heating system	Percent of farms reporting
Electric baseboard	3
Forced hot air	47
Steam	2
Hot water	26
Wood or coal stove	18
Other	4

Table 6. Type of fuels used in farm households, Upstate New York, 1986

Fuel	Primary fuel used for:		
	Heating	Hot water	Cooking
	- - - Percent of farms reporting - - -		
Oil	44	14	NA
Natural gas	13	12	9
Bottled gas	1	8	21
Electricity	1	61	67
Coal	2	*	NA
Wood	38	*	NA
Other	1	5	3

*Less than 1 percent.
NA - Not applicable.

Table 7. Electric appliances in farm households, Upstate New York, 1986

Item	Yes	No
	- - Percent of farms reporting- -	
Frost free refrigerator	67	33
Manual defrost refrigerator	23	77
Frost free freezer	24	76
Manual defrost freezer	57	43
Water pump	43	57
Black and white television	28	72
Color television	74	26
VCR	33	67
Clothes washer	78	22
Dishwasher	44	56
Portable heater	26	74
Waterbed heater	11	89
Fireplace/woodstove	42	58
Personal computer	9	91
Microwave	55	45
Clothes dryer	77	23

Table 8. Conservation measures used in farm households, Upstate New York, 1986

Item	Yes	No
	- - Percent of farms reporting- -	
Wall insulation	62	38
Ceiling insulation	64	36
Subfloor insulation	12	88
Clock thermostat	7	93
Water heater blanket	12	88
Pipe insulation	10	90
Low flow showerhead	21	79
Faucet restricter	8	92
Double or triple windows	40	60
Plastic window covers	20	80
Other	3	97

conservation measures -- such as water heater blankets and pipe insulation -- are not in common use in farm residences.

Farm Acreage, Production, and Income

Individually operated businesses dominate New York agriculture (76 percent of all farms), followed by partnerships (18 percent) and corporations (6 percent) (figure 2). Gross receipts and electrical expense follow a similar pattern, although a smaller percentage of receipts and electric expense are concentrated on individually operated farms.

The largest 8 percent of New York's farms (those with over \$250,000 gross receipts) account for 33 percent of the gross receipts (figure 3). In contrast, the 54 percent of the farms which have under \$100,000 gross receipts account for 23 percent of the gross receipts. The remaining 37 percent of farms and 44 percent of the gross receipts are on mid-sized farms (\$100,000-\$249,999 gross receipts). Electrical expense follows a distribution similar to gross receipts, although slightly less skewed toward large farms.

Many New York farms have more than one type of farm enterprise. Type of farm was defined by the enterprise which provided 50 percent or more of total gross receipts. Any farms which weren't dominated by sales from one enterprise were placed in a miscellaneous category. Dairy farms dominate Upstate New York agriculture, with 78 percent of the farms, 80 percent of the gross receipts, and 86 percent of the electric expense. Except for dairy, no type of farm accounted for more than 6 percent of the farms, 6 percent of the gross receipts, or 3 percent of the electric expense. However, other types of farms use relatively large amounts of electricity on average and are important for energy conservation programs.

Figure 2. Distribution of farms, gross receipts, and electric expense by ownership in Upstate New York.

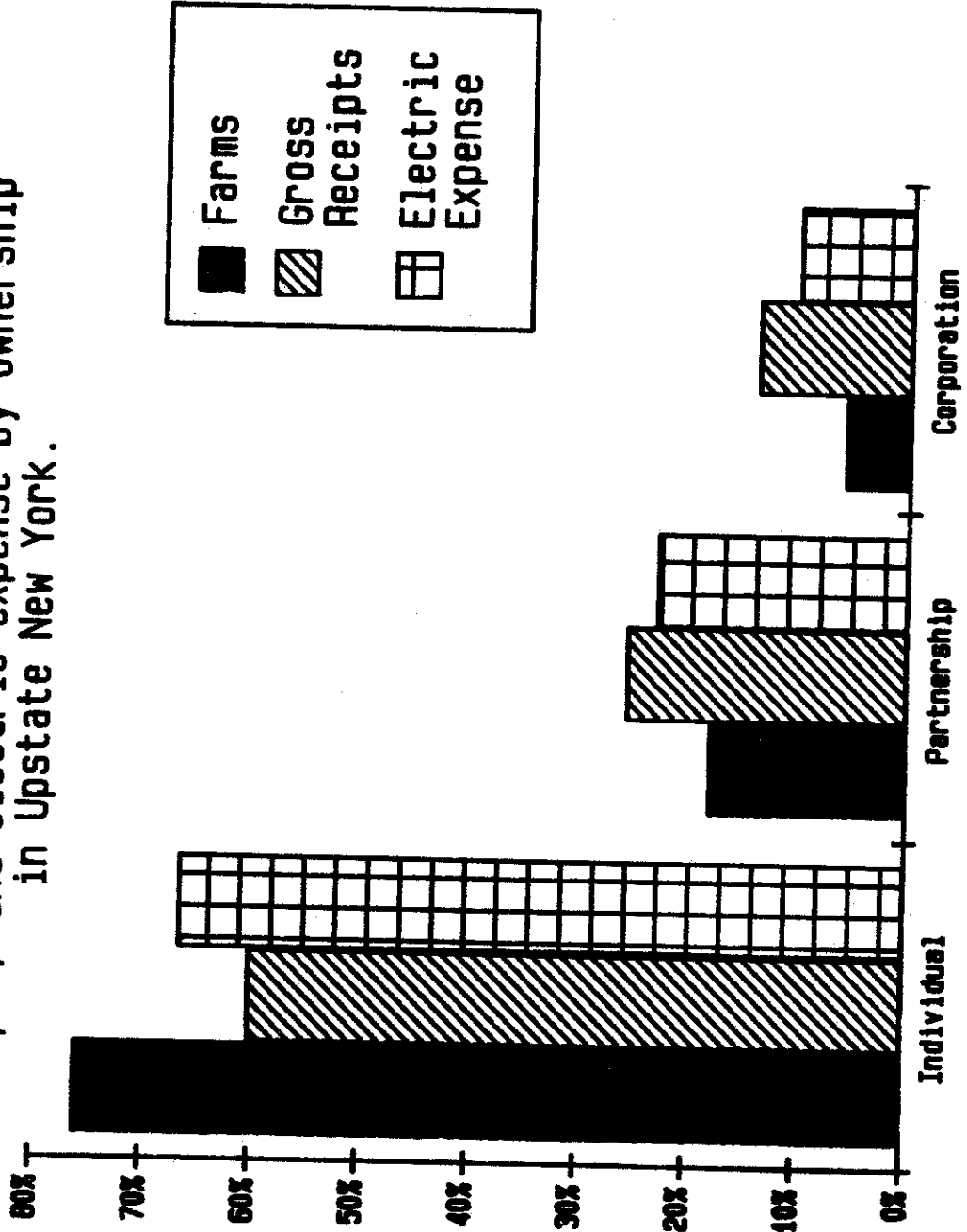
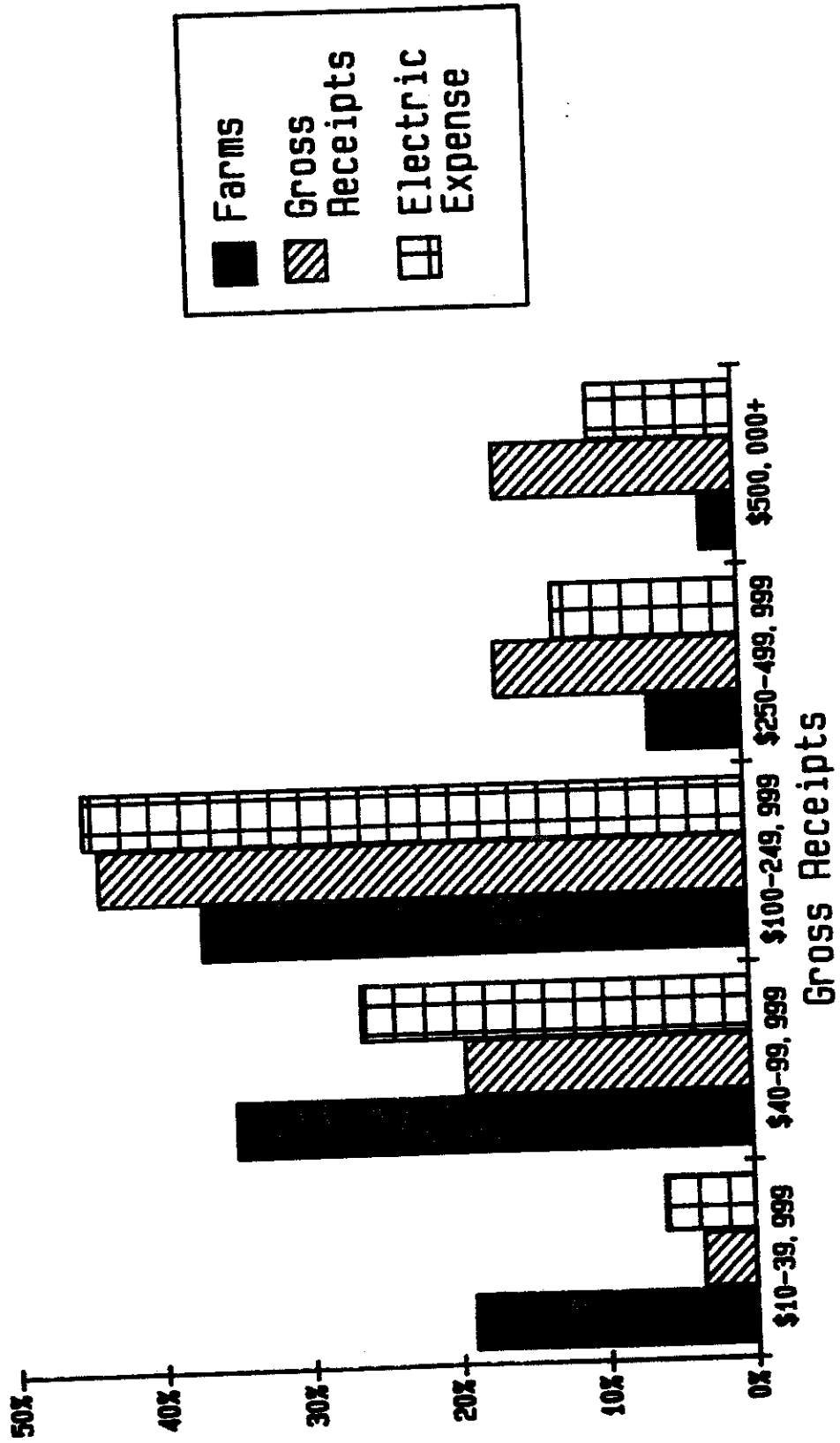


Figure 3. Distribution of farms, gross receipts, and electric expense by farm size for Upstate New York.



Farms in Upstate New York average 388 acres in size (table 9). Approximately 64 percent of this land is classified as cropland. More than one-third of all cropland is rented from others; farm operators paid an average of \$22 per acre for land rented for cash. Cash rental is the dominant arrangement for rented cropland. Farmers obtain the use of some cropland without making a cash or crop-share payment to the landlord but may provide other services in lieu of rent.

Table 9. Summary of land use by type of farm, Upstate New York, 1986

Farm type	All land operated	Total cropland	Cropland rented from others
	- - - Acres per farm - - -		
Cash crop	561	442	238
Dairy	396	242	82
General livestock	260	149	27
Grape	187	107	31
Horticulture	114	87	31
Poultry	390	217	73
Tree fruit	197	156	44
Vegetable	460	400	211
All farms	388	246	89

Cash crop and vegetable farms operate the largest cropland acreages, with 442 and 400 acres, respectively. Horticultural and grape producers operate the least amount of cropland (table 9). Overall, farms in Upstate New York rent approximately 36 percent of the cropland from other landowners. On average, cash crop and vegetable farms rent over half of the cropland they operate. This is in sharp contrast with average general livestock farms which rent only 18 percent of total cropland operated.

Net cash farm income averaged \$19,800 per farm in 1986. Off-farm income averaged \$7,400, or approximately 27 percent of an average farm household's total income. Approximately 53 percent of all Upstate farms do

not report income from a nonfarm source. Off-farm income averaged \$15,619 for those respondents reporting income from this source.

Poultry and vegetable farms reported the largest gross receipts and total expenses (table 10). General livestock farms average \$40,000 and \$32,000 in gross receipts and total expense, respectively.

Table 10. Average receipts and expenses by type of farm, Upstate New York, 1986

Farm type	Gross receipts	Total expenses
	- - - Dollars (\$1,000) - - -	
Cash crop	118	96
Dairy	131	110
General livestock	40	32
Grape	65	58
Horticulture	184	162
Poultry	330	300
Tree fruit	108	105
Vegetable	201	175
All farms	127	107

Capital investments were made by 56 percent of all farms in 1986 (table 11). The average amount spent was \$21,000. Real estate investments were the largest in absolute amount (\$42,459) but were made with the lowest frequency (5 percent of all farms). Capital outlays for purchases of machinery and equipment were the most frequently reported investments, with 45 percent of the farms spending an average of \$12,114 in 1986. Land improvement, building, and livestock investments were made by 13, 14 and 16 percent, respectively, of all Upstate New York farms.

Upstate farms had assets valued at nearly \$452,000 on average (table 12). The average farm has a debt/asset ratio of 19 percent. Real estate dominates assets and debts, accounting for 58 and 65 percent, respectively, of asset value and outstanding debt. Tree fruit and horticultural

Table 11. Capital investments for farms in Upstate New York, 1986

Item	Farms reporting	Average investment
	Percent	Dollars (\$1,000)
Real estate	5	42
Land improvements	13	4
Buildings	14	11
Livestock	16	12
Machinery & equipment	45	12
Total	56	21

Table 12. Summary of debts and assets by type of farm, Upstate New York, 1986

Farm type	Assets		Debts	
	Total	Farm real estate	Total	Farm real estate
- - - Dollars (\$1,000) - - -				
Cash crop	566	326	113	59
Dairy	427	245	90	58
General livestock	287	177	24	12
Grape	346	182	91	79
Horticulture	635	280	39	14
Poultry	614	372	71	30
Tree fruit	757	468	87	50
Vegetable	520	251	97	62
All farms	449	254	86	54

producers reported the largest amounts invested, with total assets valued at \$757,000 and \$635,000, respectively. Cash crop farms report \$566,000 in total assets and the largest average debt of any farm type (\$113,000).