

PROFITABILITY OF FEEDING DAIRY STEERS
TO FEEDER AND SLAUGHTER WEIGHT
ON NORTHEAST DAIRY FARMS

Robert A. Milligan*
Caroline J. Nowak
Wayne A. Knoblauch

June 1981

No. 81-16

*Robert A. Milligan and Wayne A. Knoblauch are Assistant Professors of Agricultural Economics and Caroline J. Nowak is a Research Support Specialist in Agricultural Economics, Cornell University, Ithaca, New York.

Profitability of Feeding Dairy Steers to Feeder and
Slaughter Weight on Northeastern Dairy Farms^{1/}

On most Northeastern dairy farms bull calves are considered a superfluous output and are sent to auction markets as soon as possible. The excess supply situation in the United States dairy industry combined with other obstacles to dairy herd expansion has resulted in dairymen seeking expansion options other than increased dairy herd size. Several alternatives for expanding the dairy farm business that utilize the bull calf as a resource are possible. Dairy beef systems that are most complementary to the ongoing dairy business should be particularly attractive to the dairyman.

The objective of this paper is to investigate the profitability of alternative dairy beef production and feeding systems in which Holstein bull calves are raised in a system compatible with many current dairy operations. For the first nine months or up to 540 pounds, the optimal growth rates of steers and heifers are similar and can be housed and fed together (Fox and Nowak). After reaching nine months of age, heifer calves raised for dairy replacements should grow more slowly than dairy steers. At this time, the steers can be sold as feeders or fed to slaughter weight. In this analysis, the rations contained in Fox and Nowak for alternative forage compositions are considered; however, all feeding systems contain large quantities of forage to be complementary with the crop producing capabilities of most Northeastern dairy farms.

Limited research is available investigating the economic potential of beef and dairy beef in the Northeast. Earlier studies of dairy beef (Hallman, Wentworth and Howland) found raising dairy beef to be economically feasible in New York. In more recent studies, Christensen and Stinson found limited potential profits from a beef cow herd in Massachusetts, and dairy beef production was found to be more profitable than other beef enterprises in the Northeast by Knoblauch, et al. 1979.

This paper extends these analyses in three ways. First, recent research results improving the knowledge of the growth response of dairy beef to high forage diets (Fox and Nowak) are incorporated into the analysis. Second, current price relationships are incorporated, and third, the production and feeding systems considered are more complementary to dairy farm businesses.

^{1/} A Symposium Paper presented at the Northeastern Agricultural Economics Council annual meetings at the University of Maryland, Baltimore, on June 15-17, 1981.

Potential profitability of raising farm produced dairy steers is investigated by analysis of two representative dairy farms. The resources from these representative farms, cost and return information from enterprise budgets and feed requirements from Fox and Nowak are utilized to obtain profit maximizing enterprise combinations using linear programming. Results from LP runs with alternative dairy beef systems and the subsequent calculation of net cash farm income and return to labor and management are used to assess potential profitability.

Representative Farms and Data Sources

One representative farm has a small dairy herd of 40 cows with restricted crop acres; the second has a larger herd size of 80 cows with a large crop acreage base (Table 1). The two farms represent conditions near the ends of the range of crop acres per cow typically found in the Northeast. A farm with a large dairy herd size is not included because it is unlikely businesses with large herds would be interested in dairy beef. Milk production and crop yields represent average to above average soil resources and management (Table 1); limitations and yields are consistent with New York and Northeast farm conditions (Smith, Knoblauch). Corn acreage limitation on the small farm is crucial to the optimal solution and thus two maximum corn acreages are considered.

Product prices and input costs (Table 2) are representative of 1980 with minor adjustments in product prices to reflect anticipated relative prices over the next ten to fifteen years. Since these prices are used as real prices, real interest rates are also used. Principal data sources for production and investment costs are Knoblauch, et al. 1980; Knoblauch and Milligan; Woodell; and Adams. More detailed source references are included in the appendix tables.

Research Procedure

The analysis of the potential for raising dairy beef feeders with the dairy heifers and then selling the feeders or raising them to slaughter weight is accomplished by comparing the enterprise organization, feeding systems and profitability of three alternative dairy beef systems with the dairy operation for each of the representative farms. The three beef production systems are (1) feeder weight dairy steers in which the steers are sold as feeders, (2) feeder and slaughter weight dairy steers in which the steers can be sold as feeders or fed to slaughter weight if profitable and (3) slaughter weight dairy steers in which a feeder market is not available and the bobcalves must be sold or raised to slaughter weight.

Three production activities are included in the LP for all livestock enterprises; each activity represents a balanced ration of alternative forage compositions (Fox and Nowak). The alternative activities facilitate the profit-maximizing use of the crop producing resources. Two of the alternatives for all livestock are roughage compositions of all hay crop and equal parts dry matter from hay crop and corn silage. The third

Table 1. Production Characteristics of Representative Dairy Farms

	Production Characteristics	
	Small Dairy	Large Dairy
Dairy Herd Size	40 cows	80 cows
Milk Sold/Cow	13,000 lbs.	13,000 lbs.
Dairy Replacements	Raise on Farm	Raise on Farm
Calf Death Loss ^{a/}	15 percent	15 percent
Calving Interval	13 months	13 months
Crop Acres	120	300
Maximum Corn Acres	30 and 60	220
Hay Crop	Mixed Mainly Grass	Mixed Mainly Legume
Crop Yields		
Hay ^{b/}	2.5 tons/acre	--
Hay Crop Silage ^{c/}	--	6.2 tons/acre
Corn Silage ^{d/}	13 tons/acre	16 tons/acre
High Moisture Shelled Corn ^{e/}	--	95 bushels/acre

^{a/} Birth to freshening or sale.

^{b/} 88 percent dry matter.

^{c/} 47 percent dry matter.

^{d/} 33 percent dry matter.

^{e/} Dry corn equivalent (89 percent dry matter).

Table 2. Product Prices and Input Costs, 1980.

<u>PRICES</u>		<u>COSTS</u>	
<u>Dairy and Beef</u>	<u>Dollars</u>	<u>Feeds</u>	<u>Dollars</u>
Feeders (lb.)	0.75	Hay	60.00
Fat Steer (lb.)	0.65	Corn Grain (bu.)	3.50
Bobcalves (head)	60.00	Soybean Meal (T)	300.00
Milk (cwt.)	12.70	Rumensin (lb.)	34.00
Cull Cows (cwt.)	45.00	Dical (cwt.)	25.00
Bred Heifers (head)	1050.00	Limestone (cwt.)	5.00
		Trace Mineral Salt (cwt.)	7.50
<u>Crops Sold</u>		<u>Labor</u>	
Corn Grain (bu.)	3.30	Hired (hr.)	4.60
Hay (T)	50.00	<u>Fertilizer</u>	
		Nitrogen (lb.)	.30
		Phosphorus (lb.)	.28
		Potassium (lb.)	.17
		<u>Capital^{a/}</u>	
		Short Term	4%
		Long Term	3%

^{a/} Nominal rate of interest adjusted for inflation.

contains a large proportion of corn silage, but with varying proportions. The high corn silage ration is twenty-five and forty-two percent of the roughage dry matter from hay crop for the dairy cows and dairy heifers, respectively. This feeding system is all corn silage for the dairy steers except for the dairy feeders where twelve percent of the roughage dry matter is from hay crop because the steers eat some hay when they are housed with the heifers. For the slaughter weight steer, three alternative rations are formulated for 540 to 850 pounds and 850 to 1250 pounds.

The linear programming objective function maximizes return over variable cost using feed requirements from Fox and Nowak, prices from Table 2 and enterprise information from Table 3. Investment costs are calculated as if the equipment complement had been purchased equally over the last nine years and buildings had been purchased equally over the last fifteen years. Cash (property taxes and insurance) and non-cash fixed expenses (depreciation, interest on investment and value of family labor) are then calculated (Appendix Tables B.1. and B.2.) to determine net cash farm income and return to operator labor and management.

Results from Small Dairy

The dairy farm with 30 corn acres and only the milking herd is self-sufficient in roughage with no sales or purchases (Table 4). Raising bobcalves to feeder weight with the heifers adds about \$1100 to the return to operator labor and management; however, it is not profitable to keep the animals to slaughter weight. If no feeder market were available, raising bobcalves with heifers and then fattening for slaughter is marginally profitable, but definitely inferior to selling feeders.

The roughage compositions of the rations are intriguing. When feeders are raised, the limited supply of corn silage is most profitably used almost exclusively for the dairy cows; however, when dairy steers are fed, the corn silage is more valuable for the 850 to 1250 pound steers.

Although the shadow prices are not affected greatly, the changes are revealing. When feeders are produced, the marginal value of another cow increases because the male calves are more valuable as feeders than they were as bobcalves and the marginal value of land increases because the limitation is stretched even further.

Relaxation of the limitation on corn acreage increases returns from the dairy herd and from the addition of dairy steer enterprises (Table 5). As with the 30 acre limitation, the introduction of the feeder enterprise is the most profitable dairy steer alternative adding about \$1500 to operator labor and management income. The slaughter weight dairy steer enterprise provides an additional \$400 to labor and management income. With all marketing options available, a small number of feeders are sold rather than fed to slaughter weight, but the advantage over feeding all bobcalves to slaughter weight (no feeder market) is minute.

Table 3. Cash Receipts and Variable Expenses Excluding Labor and Feed for Crop and Livestock Enterprises.

Enterprise	Cash Receipt	Variable Expenses Excluding Labor and Feed ^{a/}	
		Small Dairy	Large Dairy
		\$	
Dairy Cow ^{b/}	1802.40	375.39	342.50
Dairy Heifer ^{c/}	--	189.90	184.85
Dairy Beef Feeder ^{d/}	405.00	109.68	125.98
Slaughter Weight Dairy Steer ^{e/}	812.50	218.75	249.90
Hay ^{f/}	--	75.50	--
Hay Crop Silage ^{f/}	--	--	106.69
Corn Silage ^{f/}	--	132.75	130.90
Corn Grain ^{f/}	--	--	130.03

^{a/} Values used in the objective function of the LP. Variable expenses for livestock enterprises vary slightly by ration forage composition. Values presented are for half of the forage dry matter from the hay crop and half from corn silage.

^{b/} Appendix Tables A.1. and A.2. contain complete enterprise information.

^{c/} Birth to freshening at twenty-four months. Appendix Tables A.3 and A.4. contain complete enterprise information for dairy heifers.

^{d/} Birth to 540 pounds at nine months. The \$12.00 marketing costs included are not incurred if animals are fed to slaughter weight. Appendix Tables A.5. and A.6. contain complete enterprise information.

^{e/} 540 pounds to 1250 pounds slaughter weight in 341 days. Appendix Tables A.7. and A.8. contain complete enterprise information.

^{f/} Crop expenses are updated one year from Knoblauch and Milligan.

Table 4. Profitability and Optimal Enterprise Organization of Dairy Herd Only, Dairy Feeders and Slaughter Weight Dairy Steers for the Small Representative Dairy Farm with a Maximum of 30 Corn Acres

	Dairy Herd Only	Feeder and Slaughter Weight Steers	Slaughter Weight Steers
<u>Livestock Numbers</u>			
Heifer Calves Sold	0	0	0
Bred Heifers Sold	4.4	4.4	4.4
Bull Calves Sold	15.6	0	0
Feeders Sold	--	15.6	--
Slaughter Weight Steers Sold	--	0	15.6
<u>Ration Roughage Composition</u>			
Hay Crop, %--Cows	65	50	61
Hay Crop, %--Heifers	50	97	100
Hay Crop, %--Feeders	--	97	100
Hay Crop, %--Stockers	--	--	100
Hay Crop, %--Fat	--	--	0
<u>Feed</u>			
Buy Hay, tons	2.5	5	42
Dry Corn Purchased, bu.	1327	1625	2542
Soybean Meal Purchased, cwt.	290	354	327
Hay Sold, tons	0	0	0
<u>Crop Acres</u>			
Hay Crop	90	90	90
Corn Silage	30	30	30
<u>Return Over Variable Cost</u>	\$38,899	\$40,032	\$39,153
<u>Net Cash Farm Income</u>	\$32,802	\$33,935	\$33,018
<u>Fixed Costs (Non-cash)^{a/}</u>			
Dairy Operation	\$24,275	\$24,275	\$24,275
Steer Facilities	--	0	102
<u>Return to Labor and Management</u>	\$ 8,527	\$ 9,660	\$ 8,641
<u>Shadow Prices</u>			
Dairy Cow	\$ 462	\$ 491	\$ 468
Land	64	64	64
Corn Limitation	144	143	144

^{a/} Current facilities are large enough to raise feeders with the dairy heifers. See Appendix Tables B.1. and B.2. for investment costs.

Table 5. Profitability and Optimal Enterprise Organization of Dairy Herd Only, Dairy Feeders and Slaughter Weight Dairy Steers for the Small Representative Dairy Farm with a Maximum of 60 Corn Acres

	Dairy Herd Only	Feeder Weight Steers	Feeder and Slaughter Weight Steers	Slaughter Weight Steers
<u>Livestock Numbers</u>				
Heifer Calves Sold	0	0	0	0
Bred Heifers Sold	4.4	4.4	4.4	4.4
Bull Calves Sold	15.6	0	0	0
Feeders Sold	--	15.6	3.2	--
Slaughter Weight Steers Sold	--	--	12.4	15.6
<u>Ration Roughage Composition</u>				
Hay Crop, %--Cows	25	25	37	43
Hay Crop, %--Heifers	42	42	42	42
Hay Crop, %--Feeders	--	12	12	12
Hay Crop, %--Stockers	--	--	0	0
Hay Crop, %--Fat	--	--	0	0
<u>Feed</u>				
Buy Hay, tons	0	0	0	17
Dry Corn Purchased, bu.	88	88	383	497
Soybean Meal Purchased, cwt.	592	639	556	513
Hay Sold, tons	58	48	0	0
<u>Crop Acres</u>				
Hay Crop	67	64	60	60
Corn Silage	53	56	60	60
<u>Return Over Variable Cost</u>	\$40,652	\$42,184	\$42,714	\$42,667
<u>Net Cash Farm Income</u>	\$34,529	\$36,061	\$36,553	\$36,506
<u>Fixed Costs (Non-cash)^{a/}</u>				
Dairy Operation	\$24,361	\$24,361	\$24,361	\$24,361
Steer Facilities	--	--	102	102
<u>Return to Labor and Management</u>	\$10,168	\$11,700	\$12,090	\$12,043
<u>Shadow Prices</u>				
Dairy Cow	\$ 667	\$ 705	\$ 597	\$ 543
Land	39	39	58	64
Corn Limitation	0	0	43	51

^{a/} Current facilities are large enough to raise feeders with the dairy heifers. See Appendix Tables B.1. and B.2. for investment costs.

With the dairy herd only, excess hay is sold and all livestock are fed a high corn silage ration. When dairy beef feeders and steers are added, they are fed all or nearly all of their roughage as corn silage, and the dairy cows move toward equal parts of roughage dry matter from hay and corn silage.

The two analyses with the small dairy indicate that feeding the feeders with the heifers is an attractive expansion opportunity. The fattening of the feeders to slaughter weight is profitable only if adequate quantities of farm-produced roughage are available.

Results for Large Dairy

Since corn acreage is not a major limitation, only one analysis was conducted with the large dairy. As the results in Table 6 illustrate, the large dairy has a large cash grain enterprise. The addition of dairy beef enterprises would reduce this enterprise.

The addition of a feeder weight steer enterprise increases labor and management income almost \$3,000 (Table 6). Raising the feeders to slaughter weight is only profitable when feeders cannot be sold and then by less than \$100. These results are similar to the small dairy with 30 acres of corn. The cash grain enterprise provides a large enhancement to the profits of the dairy herd. The reduction in profits from this enterprise by using acreage to produce feed for slaughter weight is as great or greater than the profits from the slaughter weight steers.

Summary and Conclusions

Under the economic conditions analyzed, feeding dairy steers with the heifers for sale as feeders is profitable; however, keeping the feeders to slaughter weight rather than selling as feeders is only profitable on the small dairy with 60 corn acres (Figure 1). These results suggest that the limited crop acres and profitable cash grain enterprises limit the potential profitability of dairy beef. It should also be noted that heifer calves, not required as replacements, were raised and sold as bred heifers; consequently, heifer raising enterprises may also be more profitable than dairy beef.

In most analyses the dairy cows were fed a ration with equal parts hay and corn silage while mostly corn silage was included in dairy beef and heifer rations. These results are consistent with Knoblauch, et al.; Milligan; and Woodell. It is interesting that when corn silage was extremely limited, it was allocated to 850 to 1250 pound dairy steers and to the dairy cows.

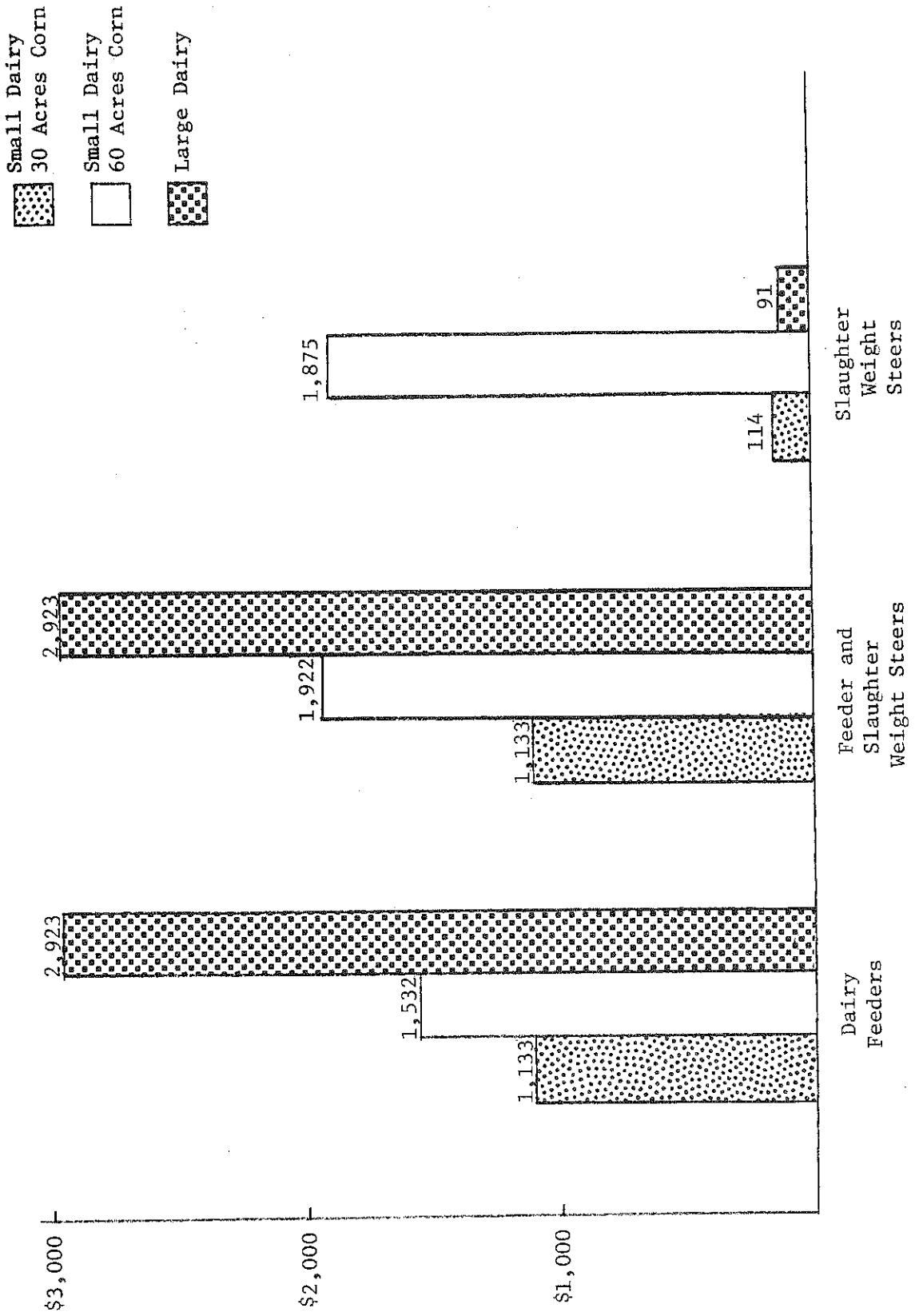
These results need to be expanded particularly to analyze farm businesses with the resources to purchase feeders in order to have a feedlot large enough to capture feedlot economies of size. The results

Table 6. Profitability and Optimal Enterprise Organization of Dairy Herd Only, Dairy Feeders and Slaughter Weight Dairy Steers for the Large Representative Dairy Farm

	Dairy Herd Only	Feeder and Slaughter Weight Steers	Slaughter Weight Steers
<u>Livestock Numbers</u>			
Heifer Calves Sold	0	0	0
Bred Heifers Sold	8.8	8.8	8.8
Bull Calves Sold	31.2	0	0
Feeders Sold	--	31.2	0
Slaughter Weight Steers Sold	--	--	31.2
<u>Ration Roughage Composition</u>			
Hay Crop, %--Cows	50	50	50
Hay Crop, %--Heifers	53	53	53
Hay Crop, %--Feeders	--	11	11
Hay Crop, %--Stockers	--	--	0
Hay Crop, %--Fat	--	--	0
<u>Feed</u>			
Soybean Meal Purchased, cwt.	416	486	554
Corn Grain Sold, bu.	8,650	7,988	5,887
<u>Crop Acres</u>			
Hay Crop	120	122	122
Corn Silage	62	67	84
Corn Grain	118	111	94
<u>Return Over Variable Cost</u>	\$104,956	\$107,879	\$108,128
<u>Net Cash Farm Income</u>	\$91,806	\$94,729	94,020
<u>Fixed Costs (Non-cash)^{a/}</u>			
Dairy Operation	\$70,747	\$70,747	\$70,747
Steer Facilities	--	--	3,081
<u>Return to Labor & Management</u>	\$34,209	\$37,132	\$34,300
<u>Shadow Prices</u>			
Dairy Cow	\$ 673	\$ 645	\$ 613
Land	149	144	143
Corn Limitation	0	0	0

^{a/} Current facilities are large enough to raise feeders with the dairy heifers. See Appendix Tables B.1. and B.2. for investment costs.

Figure 1. Increase in Operator Labor and Management Income from Dairy Feeders, Dairy Feeder and Slaughter Weight Steers and Slaughter Weight Steers Production Systems.



do indicate potential for raising dairy steers with the heifers. Whether the greatest profitability is with selling feeder weight steers or raising them to slaughter weight will depend upon the stage of the cattle cycle and short-term price relationships. Implementation of feeding feeder weight steers requires a marketing system that guarantees a market will be available.

A P P E N D I X A

Enterprise Information

Appendix Table A.1. Enterprise Information for Dairy Cows Producing 13,000 Pounds Milk for Three Alternative Forage Compositions on Small Dairy Farms, 1980 ^{a/}

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Milk	\$1626.00	\$1626.00	\$1626.00
Culls (28%; 14 cwt.)	<u>176.40</u>	<u>176.40</u>	<u>176.40</u>
TOTAL CASH RECEIPTS	<u>\$1802.40</u>	<u>\$1802.40</u>	<u>\$1802.40</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	16.50	16.50	16.50
Repairs & Maintenance	12.90	12.90	12.90
Building, Feed Storage & Equip.			
Repairs & Maintenance	76.15	79.25	77.90
Livestock			
Bedding	27.50	27.50	27.50
Vet. & Medicine	27.50	27.50	27.50
Supplies & Utilities	58.30	58.30	58.30
Other	21.45	21.45	21.45
Marketing	71.50	71.50	71.50
Breeding	22.00	22.00	22.00
Purchased Minerals			
Salt	4.40	4.20	3.80
Dical	17.25	19.25	19.25
Limestone	--	--	.90
Other Minerals	18.30	14.70	10.05
Interest on Purchased Feed	.80	.49	.66
Interest on Operating Expenses	<u>1.23</u>	<u>1.25</u>	<u>1.23</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED			
	<u>\$ 375.78</u>	<u>\$ 376.79</u>	<u>\$ 371.44</u>
Purchased Feed^{b/}			
Dry Shelled Corn	199.30	40.90	7.25
Soybean Oil Meal 48	<u>40.50</u>	<u>107.40</u>	<u>192.00</u>
Purchased Feed Expense	\$ 239.80	\$ 148.30	\$ 199.25
Grown Feed^{b/}			
Hay (tons 88% DM)	(6.1)	(3.5)	(1.58)
Corn Silage (tons 33% DM)		(7.16)	(12.92)
Labor (hrs.)	(75)	(75)	(75)

^{a/} Data sources include Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Smith.

^{b/} Requirements include feeding losses and storage losses where appropriate from Knoblauch, Milligan and Woodell, p. 57; rations formulated using least-cost balanced dairy ration program (Milligan, et al.).

Appendix Table A.2. Enterprise Information for Dairy Cows Producing 13,000 Pounds Milk for Three Alternative Forage Compositions on Large Dairy, 1980a/

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Milk	\$1626.00	\$1626.00	\$1626.00
Culls (28%; 14 cwt.)	176.40	176.40	176.40
TOTAL CASH RECEIPTS	<u>\$1802.40</u>	<u>\$1802.40</u>	<u>\$1802.40</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	14.40	14.40	14.40
Repairs & Maintenance	7.29	7.29	7.29
Building, Feed Storage & Equip.			
Repairs & Maintenance	65.36	66.40	62.50
Livestock			
Bedding	27.50	27.50	27.50
Vet. & Medicine	27.50	27.50	27.50
Supplies & Utilities	58.30	58.30	58.30
Other	21.45	21.45	21.45
Marketing	71.50	71.50	71.50
Breeding	22.00	22.00	22.00
Purchased Minerals			
Salt	3.90	3.90	3.75
Dical	13.00	16.75	18.25
Limestone	--	--	.35
Other Minerals	3.39	4.20	5.00
Interest on Purchased Feed	.01	.18	.50
Interest on Operating Expenses	1.12	1.13	1.13
VARIABLE EXPENSES EXCLUDING LABOR AND FEED	<u>\$ 336.72</u>	<u>\$ 342.50</u>	<u>\$ 341.42</u>
Purchased Feed ^{b/}			
Soybean Oil Meal 48	3.90	52.50	150.00
Grown Feed ^{b/}			
Hay Crop Silage (tons 47% DM) (7.5)		(6.5)	(3.2)
Corn Silage (tons 33% DM)		(8.7)	(12.9)
High Moisture Shelled Corn (bu. dry equiv.)	(135)	(32.5)	(7.5)
Labor (hrs.)	(55)	(55)	(55)

a/ Data sources include Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Smith.

b/ Requirements include feeding losses and storage losses where appropriate from Knoblauch, Milligan and Woodell, p. 57; rations formulated using least-cost balanced dairy ration program (Milligan, *et al.*).

Appendix Table A.3. Enterprise Information for Dairy Heifers from Birth to Freshening on Small Dairy for Three Alternative Forage Compositions, 1980a/

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS	<u>\$ 0.00</u>	<u>\$ 0.00</u>	<u>\$ 0.00</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	8.20	8.20	8.20
Repairs & Maintenance	4.80	4.80	4.80
Building, Feed Storage & Equip.			
Repairs & Maintenance	17.25	19.65	20.65
Livestock			
Bedding	30.25	30.25	30.25
Vet. & Medicine	9.90	9.90	9.90
Supplies & Utilities	16.50	16.50	16.50
Other	13.20	13.20	13.20
Breeding	22.00	22.00	22.00
Purchased Minerals and Calf Feed			
Milk Replacer	20.60	20.60	20.60
Calf Starter	4.60	4.60	4.60
Dical	12.00	24.00	27.50
Trace Mineral Salt	4.43	4.58	4.56
Interest on Purchased Feed	9.86	4.49	3.07
Interest on Operating Expenses	<u>6.55</u>	<u>7.13</u>	<u>7.31</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED	<u>\$180.14</u>	<u>\$189.90</u>	<u>\$193.14</u>
Purchased Feed ^{b/}			
Dry Shelled Corn	207.55	56.70	--
Soybean Oil Meal 48	<u>39.00</u>	<u>55.65</u>	<u>76.80</u>
Purchased Feed Expense	\$246.55	\$112.35	\$ 76.80
Labor (hrs.)	(25)	(25)	(25)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Smith.

^{b/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

Appendix Table A.4. Enterprise Information for Dairy Heifers from Birth to Freshening on Large Dairy for Three Alternative Forage Compositions, 1980^{a/}

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS	<u>\$ 0.00</u>	<u>\$ 0.00</u>	<u>\$ 0.00</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	14.82	14.82	14.82
Repairs & Maintenance	7.11	7.11	7.11
Building, Feed Storage & Equip.			
Repairs & Maintenance	16.41	17.51	13.80
Livestock			
Bedding	30.25	30.25	30.25
Vet. & Medicine	9.90	9.90	9.90
Supplies & Utilities	16.50	16.50	16.50
Other	13.20	13.20	13.20
Breeding	22.00	22.00	22.00
Purchased Minerals and Calf Feed			
Milk Replacer	20.60	20.60	20.60
Calf Starter	4.60	4.60	4.60
Dical	13.50	15.25	16.50
Trace Mineral Salt	4.50	4.50	4.50
Interest on Purchased Feed	.84	1.56	2.64
Interest on Operating Expenses	<u>6.94</u>	<u>7.05</u>	<u>6.95</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED	<u>\$181.17</u>	<u>\$184.85</u>	<u>\$183.37</u>
Purchased Feed ^{b/}			
Soybean Oil Meal 48	21.00	39.00	66.00
Labor (hrs.)	(25)	(25)	(25)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Smith.

^{b/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

Appendix Table A.5. Enterprise Information for Dairy Beef Feeders from Birth to 540 Pounds on Small Dairy for Three Alternative Forage Compositions, 1980^{a/}

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Lbs. at Marketing	540	540	540
Price per Lb.	<u>.75</u>	<u>.75</u>	<u>.75</u>
TOTAL CASH RECEIPTS	<u>\$405.00</u>	<u>\$405.00</u>	<u>\$405.00</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	2.89	2.89	2.89
Repairs & Maintenance	2.39	2.39	2.39
Building, Feed Storage & Equip.			
Repairs & Maintenance	12.72	12.83	13.58
Livestock			
Bedding	10.31	10.31	10.31
Vet. & Medicine	6.19	6.19	6.19
Supplies & Utilities	11.55	11.55	11.55
Insurance	1.16	1.16	1.16
Other	6.60	6.60	6.60
Marketing	11.80	11.80	11.80
Purchased Minerals and Calf Feed			
Milk Replacer	20.68	20.68	20.68
Calf Starter	4.60	4.60	4.60
Dical	8.00	8.75	10.75
Trace Mineral Salt	.48	.48	.48
Interest on Purchased Feeds	1.23	.97	.68
Interest on Operating Expenses	1.49	1.50	1.54
Interest on Calf	<u>6.98</u>	<u>6.98</u>	<u>6.98</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED	<u>\$109.07</u>	<u>\$109.68</u>	<u>\$112.18</u>
Purchased Feed^{b/}			
Dry Shelled Corn	58.25	31.25	0.00
Soybean Oil Meal 48	<u>24.00</u>	<u>33.45</u>	<u>45.15</u>
Purchased Feed Expense	\$ 82.25	\$ 64.70	\$ 45.15
Labor (hrs.)	(12.5)	(12.5)	(12.5)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Woodell.

^{b/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

Appendix Table A.6. Enterprise Information for Dairy Beef Feeders from Birth to 540 Pounds on Large Dairy for Three Alternative Forage Compositions, 1980a/

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Lbs. at Marketing	540	540	540
Price per Lb.	<u>.75</u>	<u>.75</u>	<u>.75</u>
TOTAL CASH RECEIPTS	<u>\$405.00</u>	<u>\$405.00</u>	<u>\$405.00</u>
VARIABLE EXPENSES			
Power and Machinery			
Fuel, Oil & Grease	18.46	18.46	18.46
Repairs & Maintenance	7.40	7.40	7.40
Building, Feed Storage & Equip.			
Repairs & Maintenance	7.56	8.16	5.91
Livestock			
Bedding	10.31	10.31	10.31
Vet. & Medicine	6.19	6.19	6.19
Supplies & Utilities	11.55	11.55	11.55
Insurance	1.16	1.16	1.16
Other	6.60	6.60	6.60
Marketing	11.80	11.80	11.80
Purchased Minerals and Calf Feed			
Milk Replacer	20.68	20.68	20.68
Calf Starter	4.60	4.60	4.60
Dical	9.25	9.50	10.75
Trace Mineral Salt	.48	.48	.48
Interest on Purchased Feeds	.18	.36	.57
Interest on Operating Expenses	1.74	1.75	1.74
Interest on Calf	<u>6.98</u>	<u>6.98</u>	<u>6.98</u>
VARIABLE EXPENSES EXCLUDING FEED AND LABOR	<u>\$124.94</u>	<u>\$125.98</u>	<u>\$125.18</u>
Purchased Feed^{b/}			
Soybean Oil Meal 48	11.85	24.15	38.25
Labor (hrs.)	(12.5)	(12.5)	(12.5)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Woodell.

^{b/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

Appendix Table A.7. Enterprise Information for Dairy Beef Steer from 540 to 1250 Pounds on Small Dairy for Three Alternative Forage Compositions, 1980^{a/}

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Lbs. at Marketing	1,250	1,250	1,250
Price per Lb.	.65	.65	.65
TOTAL CASH RECEIPTS	<u>\$812.50</u>	<u>\$812.50</u>	<u>\$812.50</u>
VARIABLE EXPENSES			
Power and Machinery			
Fuel, Oil & Grease	5.86	13.26	13.26
Repairs & Maintenance	2.32	4.96	4.96
Building, Feed Storage & Equip.			
Repairs & Maintenance	6.99	6.86	7.43
Livestock			
Bedding	16.50	16.50	16.50
Vet. & Medicine	9.35	9.35	9.35
Supplies & Utilities	6.28	6.28	6.28
Growth Stimulants	4.00	4.00	4.00
Insurance	2.19	2.19	2.19
Marketing	14.00	14.00	14.00
Purchased Minerals			
Rumensin	7.47	7.47	7.47
Dical	3.00	3.00	11.00
Limestone	--	--	2.20
TMS	2.40	2.33	2.48
Urea	--	2.31	5.06
Interest on Purchased Feed ^{b/}	7.15	5.22	6.59
Interest on Operating Expenses ^{b/}	5.58	5.83	6.18
Interest on Steer	<u>17.51</u>	<u>17.51</u>	<u>17.51</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED			
	<u>\$110.60</u>	<u>\$121.07</u>	<u>\$136.46</u>
Purchased Feed ^{c/}			
Dry Shelled Corn	202.65	130.90	--
Soybean Oil Meal 48	<u>15.00</u>	<u>19.05</u>	<u>34.20</u>
Purchased Feed Expense	\$217.65	\$149.95	\$ 34.20
Labor (hrs.)	(11.5)	(11.5)	(9.7)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Woodell.

^{b/} Interest on purchased feed and operating expenses includes capital charges incurred as feeders.

^{c/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

Appendix Table A.8. Enterprise Information for Dairy Beef Steers from 540 to 1250 Pounds on Large Dairy for Three Alternative Forage Compositions, 1980^{a/}

	Alternative Forage Compositions		
	Hay Only	Equal Proportions CS & Hay, DM	Corn Silage Based
CASH RECEIPTS			
Lbs. at Marketing	1,250	1,250	1,250
Price per Lb.	.65	.65	.65
TOTAL CASH RECEIPTS	<u>\$812.50</u>	<u>\$812.50</u>	<u>\$812.50</u>
VARIABLE EXPENSES			
Power & Machinery			
Fuel, Oil & Grease	18.46	18.46	18.46
Repairs & Maintenance	7.47	7.47	7.47
Building, Feed Storage & Equipment			
Repairs & Maintenance	11.33	14.15	12.98
Livestock			
Bedding	16.50	16.50	16.50
Vet. & Medicine	9.35	9.35	9.35
Supplies & Utilities	6.28	6.28	6.28
Growth Stimulants	4.00	4.00	4.00
Insurance	2.19	2.19	2.19
Marketing	14.00	14.00	14.00
Purchased Minerals			
Rumensin	7.47	7.47	7.47
Dical	8.00	8.25	16.00
Limestone	--	--	1.15
Trace Mineral Salt	2.40	2.47	2.40
Urea	--	--	5.06
Interest on Purchased Feed ^{b/}	.44	1.04	2.05
Interest on Operating Expenses ^{b/}	6.68	6.78	6.99
Interest on Steer	<u>17.51</u>	<u>17.51</u>	<u>17.51</u>
VARIABLE EXPENSES EXCLUDING LABOR AND FEED			
	<u>\$132.08</u>	<u>\$135.92</u>	<u>\$149.86</u>
Purchased Feed^{c/}			
Soybean Oil Meal 48	0.00	7.50	32.40
Labor (hrs.)	(10.1)	(10.1)	(10.1)

^{a/} Data sources include Fox and Nowak; Knoblauch, Milligan and vanLieshout; Knoblauch, Milligan and Woodell; and Woodell.

^{b/} Interest on purchased feed and operating expenses includes capital charges incurred as feeders.

^{c/} Requirements include feeding and storage losses. For complete rations see Fox and Nowak.

A P P E N D I X B

Investment Information

Appendix Table B.1. Machinery Complement and 1980 Investment Cost for Small and Large Dairy.

Machinery	1980 Investment Cost	
	Small Dairy	Large Dairy
Tractor, 125 hp with Cab	\$ --	\$41,000
Tractor, 60 hp	16,300	16,300
Tractor, 40 hp	11,500	--
Plow, 4-16"	--	5,040
Plow, 3-16"	1,650	--
Disc Harrow, 13'	4,500	4,500
Spring Tooth Harrow, 16'	--	1,850
Spring Tooth Harrow, 12'	950	--
Cultipacker, 12'	1,320	1,320
Cultipacker Seeder, 10'	2,800	2,800
Corn Planter, 4 row	6,300	6,300
Cultivator, 4 row	3,200	3,200
Sprayer	2,240	2,240
Mower, Conditioner, Windrower, 9'	6,400	6,400
Side Delivery Rake	2,020	2,400
Forage Harvester	--	9,300
w/ 2 Row Corn Head	--	2,750
w/ Windrow Pickup	--	1,650
Forage Wagons, 2 @ \$5,600	11,200	11,200
Baler w/ Bale Thrower	7,800	--
Bale Wagons, 2 @ \$1,790	3,580	--
Forage Harvester w/ 1 Row Crophead	5,025	--
Combine, Gasoline, Cab, 3 Row Corn Head	--	46,000
Grain Wagons, 2 @ \$2,020	--	4,040
Automatic Batch Dryer	--	9,500
Tractor Loader and Scraper	2,200	2,200
Manure Spreader, 340 bu.	--	7,500
Manure Spreader, 215 bu.	4,400	--
Mixer Wagon	--	10,000
Pickup Truck, 1/2 ton	<u>6,830</u>	<u>6,830</u>
Total Investment	\$100,215	\$204,320

Appendix Table B.2. Dairy Cow and Heifer Buildings, Feed Storage and Equipment and 1980 Investment Costs for Small and Large Dairy.

Facility	1980 Investment Cost	
	Small Dairy	Large Dairy
Dairy Housing and Milking System	\$ 78,510	\$140,560
Heifer Barn and Equipment ^{a/}	13,200	16,078
Machinery Storage	6,700	15,904
Feed Storage, Dairy Cows and Heifers ^{a/}	45,780	76,956
Housing, Steers ^{a/}	1,492	10,800
Feed Storage, Steers ^{a/}	0	26,147
Land	24,000	150,000
Dairy and Heifer Livestock	<u>84,516</u>	<u>169,032</u>
Total	\$254,198	\$605,477

^{a/} Facilities are available for the feeders but not for the steers. Extra investment for the steers is zero, as the small dairy will store all grown feed. Feed storage, dairy cows and heifers is for 60 acre corn restriction; feed storage cost for 30 acre corn restriction is \$44,820.

References

- Adams, J. S. Fulton-Montgomery-Schoharie-Schenectady Counties 1980 Dairy Construction Cooperative Extension Tour-By-Mail. New York State Cooperative Extension, 1981.
- Christensen, Robert L. and Robert Stinson. Economics of Beef Production in Massachusetts. Cooperative Extension Service C-145, University of Massachusetts, 1980.
- Fox, Danny G. and Caroline J. Nowak. Feeding and Management Strategies for Producing Beef from Holstein Steers on Northeast Dairy Farms. Dept. Agr. Econ. Staff Paper No. 81-17, Cornell University, 1981.
- Hallman, Jr., Lester C. "Raising Dairy Calves for Beef Purposes." J. Animal Science. 32 (1971):442-445.
- Knoblauch, Wayne A. Dairy Farm Business Summary, Western Plain Region 1980. Dept. Agr. Econ. A.E.Ext. 81-12, Cornell University, 1981.
- Knoblauch, Wayne A. and Robert A. Milligan. Economic Profiles for Corn, Hay and Pasture. Dept. Agr. Econ. A.E.Ext. 81-1, Cornell University, 1981.
- Knoblauch, Wayne A., Robert A. Milligan, Danny G. Fox and Merri L. Woodell. Economic Utilization of Forages in the Production of Milk and Beef in the Northeast United States. Dept. Agr. Econ. Staff Paper No. 79-29, Cornell University, 1979.
- Knoblauch, Wayne A., Robert A. Milligan, Richard J. Haslem and Marylou M. vanLieshout. An Economic Analysis of New York Field Crop Enterprises. Dept. Agr. Econ. A.E.Res. 80-6, Cornell University, 1980.
- Knoblauch, Wayne A., Robert A. Milligan and Marylou vanLieshout. Unpublished Livestock Enterprise Budgets. Cornell University, 1980.
- Milligan, Robert A. "Selecting a Forage System." "Research and Ideas for the Future" Proceedings 1979 Dairy Days. Dept. An. Sci. Mimeo No. 40, Cornell University, 1979.
- Milligan, Robert A., Larry E. Chase, Charles J. Sniffen and Wayne A. Knoblauch. Least-Cost Balanced Dairy Rations NEWPLAN Program 31 Form 4, A Computer Program Users' Manual. Dept. Agr. Econ. A.E.Ext. 80-25 and A.S.Mimeo 52, Cornell University, 1980.
- Smith, Stuart F. Dairy Farm Management Business Summary, New York 1979. Dept. Agr. Econ. A.E.Res. 80-16, Cornell University, 1980.
- Wentworth, David and Camille Howland. Raising Dairy Beef in the North Country. The St. Lawrence County Bankers Assoc. and Canton College Foundation, Inc., 1978.
- Woodell, Merry Lynn. "An Economic Analysis of Alternative Beef Feedlot Systems in New York State." M.S. thesis, Cornell University, 1981.