



Millionaire Model Dairy Farms -- Part V

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ISU Extension's Millionaire Model Dairy Farms Project (MMDF) aims to inspire beginning and transitioning dairy producers towards more profitable operations. Financial data from 2013 was collected for these Midwest farms defined as hybrid grazing farms that use best management practices of both convention and grazing dairies. It is hoped this project is of benefit to other dairy producers, Extension educators and consultants for benchmarking and budgeting.

One model beginning dairy producer was the focus of Part I of this series. Defining the financial model and sharing the past results of the model farms was the focus of Part II of this series. Describing the reasons for success and production practices of these model dairy farms was the focus of Part III of this series. Part IV focused on one model producer over a 10 year period. Part V aims to focus on the 2013 financial analysis to help producers understand the value of financial analysis and benchmarking.

In a nutshell, the Millionaire Model Dairy Farms (MMDF) collectively focused on:

- 1) Labor Efficiency
- 2) Cost Effective Parlors and Facilities
- 3) Management Intensive Grazing
- 4) Cross Breeding
- 5) Semi-Seasonal Calving
- 6) Dairy TRANS Financial Analysis

The MMDF averaged 261 acres operated and 166 cows or 1.58 acres operated per cow. The range in cow numbers was 137 to 178 cows per farm. Total Ending Farm Assets averaged \$13,239 per cow. No debts were included. Instead, an equity charge of 3.5% across all assets was used. This equity charge concept slightly changes the analysis. First, the cash flow is done pre-tax and without principal and interest payments. Second, cash expenses exclude interest payments as well, changing calculations that include cash expenses. The ending cash flow averaged \$116,039 before taxes, principal and interest.

As beginning and transitioning producers look toward the MMDF option, the incomes and expenses tend to become good benchmarks to budget with on a per cow basis (and per cwt. equivalent basis if milk production levels are not significantly different).

Below are the cash incomes and expenses adjusted for changes in inventory.

Table 1. 2013 Incomes and Expenses

Cash Incomes	per cow	per cwt.eq.
Milk Sales	\$3,925	\$20.07
Cull Cow Sales (30%)	\$238	
Calf Sales	\$57	
Crop Sales	\$89	
Other Income	\$199 (government, coop, etc.)	
Total Cash Income	\$4,509.	

Note: The cull rate ranged from 18%-45% but averaged 30%. This is higher than normal but due to high cull cow prices.

Cash Expense	per cow	per cwt.eq.
Vet & Medicine	\$79	\$0.34
Dairy Supplies	\$205	\$0.88
Breeding Fees	\$27	\$0.12
Feed Purchased	\$1,508	\$6.46
Repairs	\$139	\$0.60
Seed/Chem/Fertilizer	\$305	\$1.31
Fuel, Gas and Oil	\$140	\$0.60
Utilities	\$72	\$0.31
Labor Hired	\$367	\$1.57
Rent, Lease and Hire	\$270	\$1.15
Property Taxes	\$44	\$0.19
Farm Insurance	\$57	\$0.25
Other Cash Expenses	\$109	\$0.47
Total Cash Expenses	\$3,321	\$14.23

Net Cash Income	\$1,188	\$5.09
Inventory Change	- \$135	\$0.58
Net Farm Income	\$1,323	\$5.67

Analyzing Returns to Labor

Labor Efficiency is priority one with the MMDF. Production per cow needs to be balanced with production per labor unit. This author challenges that there *tends* to be more profit with production per labor unit than production per cow, though both are extremely important to optimize in a dairy operation.

Net Farm Income on the MMDF averaged \$219,014. From this figure, only equity and unpaid labor are not accounted for as expenses. The equity charge at 3.5% of assets averaged \$78,822 leaving a return to unpaid labor of \$140,193 or approximately \$847 per cow or approximately \$45.54 per hour worked. The return to unpaid labor ranged from \$31.05 to \$60.32.

**Note: The "average" is calculated as the sum of the individual five farms for each item, not a previous item's sum divided by another item's sum, which yields slightly different results.*

Total Costs of Production in 2013

The average milk price received was \$20.07. Total cost of production with the 3.5% equity charge and a \$40,000 opportunity cost per FTE for the unpaid labor, gives a total cost of producing milk for the MMDF at \$17.47. This leaves a profit in 2013 of \$2.60 per cwt of milk produced—a profitable year!

Efficiencies of Labor, Cows and Land



Labor efficiency begins with cow management, the milking parlor and the dollars generated by labor on these MMDF. Starting with the latter, the average MMDF had an adjusted gross return of \$320,653 per full-time labor equivalent (FTE) and a net return per FTE of \$79,841. One FTE is 3,000 hours of labor.

MMDF averaged 69 cows per full time labor equivalent (FTE) and averaged 1.32 million pounds of milk sold per FTE annually. These are great benchmarks for labor efficiency.

Cow efficiency begins with production per cow balancing cow maintenance costs with feed and other expenses. High milk production per cow is no guarantee of profit but low milk production sure decreases the chances. The average MMDF milk Holsteins or Holstein based crossbred cows and averaged 19,390 pounds of milk in 2013. Milk production ranged from 14,762 pounds per cow to 22,784 per cow. The highest herd average was not the most profitable of the MMDF and the lowest herd average was not the least profitable of the MMDF.

Capital cost per cow (depreciation and interest or equity costs) averaged \$668 per cow; all labor costs per cow averaged \$593; all fixed costs per cow (depreciation, interest, repairs, taxes and insurance) averaged \$908 per cow with an average capital investment per cow of \$12,120. Capital costs on dairy farms continue to increase. Thus, concern over **capital efficiency** will continue in the future with MMDF due to escalation in building and land costs.

Land efficiency or efficiency per productive crop or grazing acre begins with quality and quantity of forage produced balanced by subsequent dry matter intakes of dairy cows on pasture. Net farm income averaged \$909 per productive acre owned or rented. Pounds of milk produced per crop acre averaged 14,217 highlighting an increase of cattle intensity per acre and an increase in milk production per cow.

Ranking Profitability with Dairy TRANS

Dairy TRANS 4.44 is a user-friendly EXCEL based software program credited with substantially increasing dairy farm profits for its users. It starts with calculating producer's numbers on dollar value, per cow, per cwt. equivalent and comparing actuals to benchmarks. Dairy TRANS focuses on labor, cow and land efficiencies to create a profit picture.

Return on Assets (ROA) is the basis of the profit equation: $\text{Profit} = (\text{Price} - \text{Cost}) \times \text{Volume}$. Or, another way to look at the profit equation is: $\text{ROA} = \text{Operating Profit Margin} \times \text{Asset Turnover Ratio}$.



The MMDF had an average Return on Assets of 8.87%. Their Operating Profit Margin was 22.60% meaning they kept over 22 cents for every dollar of income. The MMDF had an average Asset Turnover Ratio of 41.74% meaning they grossed enough income to pay for all the assets on the farm in less than 2.5 years.

Overall, the MMDF achieved a Dairy TRANS Profit Performance Rating of 83.40% which is "Great". Every dairy operation has financial variation and has its own financial and productive strengths and weaknesses. The goal of Dairy TRANS 4.44 is to assist dairy producers understand the profitability of their dairy farm to inspire even more profitability.

In sum, the 2013 MMDF data can hopefully serve as a benchmark and budgeting guide and an inspiration for others looking to compare the profitability of dairying in this hybrid system versus other types of dairy systems.

For more information on the Dairy TRANS Software contact: Larry Tranel, Dubuque County ISU Extension, 14858 West Ridge Lane, Dubuque, IA 52003, tranel@iastate.edu

Thanks to the dairy producers who have so graciously shared their financial data for others to learn from.

Model Dairy Graziers 2013	Dairy 1	Dairy 2	Dairy 3	Dairy 4	Dairy 5	Average	Per Cow	Page 1
Productive Crop Acres Operated	215	160	150	300	481	261.20	1.58	
Average Number of Cows	178	137	170	175	168	165.60		
Total Assets on Farm	\$1,620,369	\$1,445,473	\$1,101,950	\$3,298,621	\$3,495,599	\$2,192,402	\$13,239	
Non-farm Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00	
Family Living Expenses	\$45,000	\$30,000	\$50,000	\$50,000	\$42,000	\$43,400	\$262.08	
Capital Purchases	\$51,200	\$51,000	\$0	\$25,000	\$40,000	\$33,440	\$201.93	
Ending Cash Flow* before debt service	\$70,722	\$81,441	\$93,184	\$208,723	\$126,127	\$116,039	*Cash Flow done pre-tax and without principal and interest	
Ending Cash Flow Ratio	10.01%	21.03%	15.00%	28.75%	17.58%	18.47%		
Milk Price	19.48	20.44	20.12	20.34	19.96	\$20.07		
Milk Hundred weight Equiv.	40,951	23,540	35,971	50,589	42,247	38,660	233.45	
Milk Hundredweights	35,464	20,223	32,284	39,872	34,327	32,434	195.86	
Milk Sales	\$690,816	\$413,290	\$649,639	\$810,824	\$685,328	\$649,979	\$3,925	
Cull Cow Sales ~18-45% ^\$\$	\$49,789	\$31,572	\$41,922	\$30,680	\$43,075	\$39,408	\$237.97	29.74%
Calf Sales	\$10,301	\$10,081	\$10,445	\$6,730	\$9,912	\$9,494	\$57.33	
Crop Sales	\$0	\$0	\$0	\$25,899	\$48,000	\$14,780	\$89.25	
Other Income	\$26,296	\$8,895	\$12,208	\$60,611	\$57,130	\$33,028	\$199.44	
Total Cash Income	\$777,202	\$463,838	\$714,214	\$934,744	\$843,445	\$746,689	\$4,509	per cwt eq.
Veterinary, Medicine	\$7,752	\$3,593	\$11,043	\$30,832	\$11,994	\$13,043	\$78.76	\$0.34
Dairy Supplies	\$29,704	\$22,667	\$28,883	\$59,716	\$28,637	\$33,921	\$204.84	\$0.88
Breeding Fees	\$0	\$0	\$4,401	\$12,221	\$6,122	\$4,549	\$27.47	\$0.12
Feed Purchased	\$353,579	\$158,640	\$280,571	\$236,793	\$218,816	\$249,680	\$1,507.73	\$6.46
Repairs	\$19,133	\$14,221	\$5,967	\$28,310	\$47,474	\$23,021	\$139.02	\$0.60
Seed, Chem, Fert	\$25,272	\$25,546	\$28,404	\$52,865	\$120,440	\$50,505	\$304.98	\$1.31
Fuel, Gas, and Oil	\$15,455	\$14,565	\$19,954	\$39,342	\$26,423	\$23,148	\$139.78	\$0.60
Utilities	\$9,162	\$4,150	\$14,374	\$19,317	\$12,717	\$11,944	\$72.13	\$0.31
Interest Paid -- is not included in this analysis. Instead all assets are charged a 3.5% opportunity cost.								\$0.00
Labor Hired	\$81,285	\$31,819	\$43,064	\$61,797	\$85,903	\$60,774	\$366.99	\$1.57
Rent, Lease and Hire	\$10,944	\$0	\$107,383	\$86,025	\$18,768	\$44,624	\$269.47	\$1.15
Property Taxes	\$6,290	\$6,501	\$3,306	\$9,186	\$11,180	\$7,293	\$44.04	\$0.19
Farm Insurance	\$12,935	\$7,491	\$9,897	\$5,482	\$11,612	\$9,483	\$57.27	\$0.25
Other Cash Expense	\$19,750	\$12,204	\$13,783	\$9,135	\$35,232	\$18,021	\$108.82	\$0.47
Total Cash Expense	\$591,261	\$301,397	\$571,030	\$651,021	\$635,318	\$550,005	\$3,321	\$14.23
Net Cash Income	\$185,941	\$162,441	\$143,184	\$283,723	\$208,127	\$196,683	\$1,188	\$5.09
Inventory Change	\$49,970	(\$10,726)	(\$11,280)	\$53,633	\$30,059	\$22,331	\$134.85	\$0.58
Net Farm Income	\$235,910	\$151,715	\$131,904	\$337,356	\$238,186	\$219,014	\$1,323	\$5.67
Equity@	\$54,942	\$49,887	\$38,766	\$129,394	\$121,120	\$78,822	\$476	\$2.04
Return to Labor	\$180,968	\$101,828	\$93,139	\$207,962	\$117,066	\$140,193	\$847	\$3.63
Inventory Adjustments--Feed	\$14,553	\$32,324	\$35,420	\$37,970	\$101,899	\$44,433	\$268.32	\$1.15
Supplies and Other	\$7,800	\$0	-\$2,700	\$0	\$0	\$1,020	\$6.16	\$0.03
Breeding Livestock	-\$1,850	-\$15,100	\$23,100	\$56,050	(\$13,900)	\$9,660	\$58.33	\$0.25
Income Change	\$20,503	\$17,224	\$9,620	\$94,020	\$87,999	\$45,873	\$277.01	\$1.19
Prepaid Expenses	\$11,467	\$550	\$1,900	(\$15,387)	\$0	-\$294	-\$1.78	-\$0.01
Accounts Payable	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00	\$0.00
Machinery & Equipment	\$70,600	\$22,500	-\$22,800	\$0	(\$14,680)	\$11,124	\$67.17	\$0.29
Land and Buildings	-\$1,400	\$0	\$0	\$0	(\$7,440)	-\$1,768	-\$10.68	-\$0.05
Other Adjustments	\$0	\$0	\$0	\$0	\$4,180	\$836	\$5.05	\$0.02
Expense Change	-\$80,667	-\$23,050	\$20,900	\$15,387	\$17,940	-\$9,898	-\$59.77	-\$0.26
Capital Purchases Minus Sales Adj.	\$51,200	\$51,000	\$0	\$25,000	\$40,000	\$33,440	\$201.93	\$0.86
Depreciation COST	\$72,461	\$51,790	\$50,000	\$170,000	\$92,000	\$87,250	\$526.87	\$2.26
Depreciation FM Value	\$22,300	\$27,500	\$22,800	\$25,000	\$63,000	\$32,120	\$193.96	\$0.83

Model Dairy Graziers 2013	Dairy 1	Dairy 2	Dairy 3	Dairy 4	Dairy 5	Average	Per Cow	Page 2
Unpaid Labor Cost	\$40,000	\$24,000	\$40,000	\$50,000	\$40,000	\$38,800	\$234.30	\$1.00
Unpaid Labor Hours	3,000	1,800	3,000	4,400	3,600	3,160	19	
Labor Full Time Equivalents	3.00	1.70	2.00	3.22	2.50	2.48		
Labor Earnings Per Hour	\$60.32	\$56.57	\$31.05	\$47.26	\$32.52	\$45.54		
Gross Income per Cwt. Eq.	\$19.48	\$20.44	\$20.12	\$20.34	\$19.96	\$20.07		
Gross Expense per Cwt. Eq.	\$16.04	\$17.13	\$18.65	\$17.21	\$18.31	\$17.47		
Net Income per cwt.	\$3.44	\$3.31	\$1.48	\$3.12	\$1.65	\$2.60		
Cash Income--	\$777,202	\$463,838	\$714,214	\$934,744	\$843,445	\$746,689	\$4,509	
Adjusted Income	\$20,503	\$17,224	\$9,620	\$94,020	\$87,999	\$45,873	\$277	
Total Income	\$797,704	\$481,062	\$723,834	\$1,028,764	\$931,444	\$792,562	\$4,786	
Cash Costs	\$591,261	\$301,397	\$571,030	\$651,021	\$635,318	\$550,005	\$3,321	
Adjusted Costs	(\$29,467)	\$27,950	\$20,900	\$40,387	\$57,940	\$23,542	\$142	
Overhead Costs	\$94,942	\$73,887	\$78,766	\$179,394	\$161,120	\$117,622	\$710	
Total Costs	\$656,736	\$403,234	\$670,695	\$870,802	\$854,378	\$691,169	\$4,174	
RETURN OVER COSTS	\$140,968	\$77,828	\$53,139	\$157,962	\$77,066	\$101,393	\$612	
Adj. Gross Return per FTE Labor.....	\$265,901	\$282,978	\$361,917	\$319,889	\$372,578	\$320,653		
Return to All Labor per FTE Labor.....	\$87,418	\$78,616	\$68,101	\$83,880	\$81,188	\$79,841		
Number of Cows per FTE Labor.....	59	81	85	54	67	69		
Cwts. of Milk Sold per FTE Labor.....	11,821	11,896	16,142	12,398	13,731	13,198		
Pounds of Milk Sold per Cow.....	19,924	14,762	19,047	22,784	20,433	19,390		
Productive Crop Acres per Cow.....	1.20	1.17	0.88	1.7	2.9	1.57		
Capital Cost per Cow.....	\$434	\$565	\$363	\$882	\$1,096	\$668		
All Labor Costs per Cow.....	\$681	\$407	\$490	\$639	\$749	\$593		
Fixed Cost per Cow (DIRTI)	\$649	\$771	\$476	\$1,128	\$1,514	\$908		
Capital Invested per Cow.....	\$8,233	\$9,663	\$5,960	\$16,957	\$19,785	\$12,120		
Net Farm Income per Crop Acre.....	\$1,097	\$948	\$879	\$1,125	\$495	\$909		
Lbs. Milk Produced per Crop Acre.....	16,495	12,640	21,523	13,291	7,137	14,217		
Adj. Gross Cash Income/Crop Acre.....	\$3,710	\$3,007	\$4,826	\$3,429	\$1,936	\$3,382		
Machinery Investment/Crop Acre	\$910	\$1,477	\$1,444	\$962	\$1,033	\$1,165		
Fuel, Gas and Oil Cost/Crop Acre.....	\$72	\$91	\$133	\$131	\$55	\$96		
Repair Cost per Crop Acre.....	\$89	\$89	\$40	\$94	\$99	\$82		
Fert/Chem/Seed Cost/Crop Acre.....	\$118	\$160	\$189	\$176	\$250	\$179		
Livestock over Total Investment %	25%	20%	28%	14%	12%	19.8%		
Cash Exp./Cash Inc.w/o Labor&Int.....	66%	58%	74%	63%	65%	65.1%		
All Labor as Percent of Total Costs.....	18%	14%	12%	13%	15%	14.5%		
Fixed Cost as Percent of Total Cost.....	18%	26%	12%	23%	30%	21.7%		
**Net Farm Income From Operations	\$235,910	\$151,715	\$131,904	\$337,356	\$238,186	\$219,014		
**Rate of Return on Assets.....	12.48%	8.96%	8.30%	8.88%	5.73%	8.87%		
**Rate of Return on Equity.....	12.48%	8.96%	8.30%	8.88%	5.73%	8.87%		
**Operating Profit Margin.....	24.56%	26.55%	12.70%	27.93%	21.28%	22.60%		
**Asset Turnover Ratio.....	51%	34%	65%	32%	27%	41.74%		
**Operating Expense Ratio.....	68%	63%	79%	65%	68%	68.36%		
**Depreciation Expense Ratio.....	3%	6%	3%	2%	7%	4.22%		
**Net Farm Income Ratio.....	30%	32%	18%	33%	26%	27.80%		
Estimated % Interest Paid	0%	0%	0%	0%	0%	0.00%		
Dairy TRANS Profit Status is.....	Superb	Superb	Great	Great	Good	GREAT!!!		
Dairy TRANS Performance Rating	103.00%	86.00%	80.00%	84.00%	64.00%	83.40%		

Model Dairy Graziers 2013
generated by
DAIRY TRANS 4.44
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