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Michigan State University Extension Service
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Dairy Farm Debt Servicing Capacity

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The objectives of dairy farm financial management should include generating enough income to cover all cash farm expenses, support the families involved with the business, and manage debt commitment so that all interest and principal payments can be made. Before making a commitment to a debt structure, managers should calculate the money left for making interest and principal payments after all other needs are met. This is the debt servicing capacity. The simplified format is:

Debt Servicing Capacity

Cash flowing in	
Items produced to sell (milk, crops, calves)	\$ _____
Capital items sold (cull cows, machines)	\$ _____
Total cash in	\$ _____
Cash flowing out	
Cash expense items (excluding interest)	\$ _____
Family living needs (owner or partners)	\$ _____
Total cash out	\$ _____
Available for debt servicing (Cash in minus cash out)	\$ _____

For farm use, this format must be expanded by using more subheadings. It is easiest if the subheadings are the same as those used in the farm's accounting records. Table 1 shows how dairy farm income and expense subheadings may be added to the above format. It also shows actual results obtained by specialized Michigan dairy farmers for 1982, 1983 and 1984 when grouped by milk sold per cow. Table 1 does not show total production costs or income, as no non-cash items such as depreciation and inventory changes are included. The items in Table 1 are explained below.

Cash income. Money received from milk sales for the year is shown on line 1; it was 76 to 82 percent of the total cash income. Livestock, mainly cull cows and young calves, provided 9 to 11 percent of cash income. Crop sales were 4 to 8 percent of cash income. The cropping program provided 62 to 71 percent of the herd's needs, but the cash part of farm-grown feed is within line 10, the crop production expenses. Capital sales of machinery, improvements and land were 0 to 2 percent of cash income. Such things as custom work, refunds, forest products and government payments are other income and amount to 3 to 5 percent of cash income. Milk price, production levels and beef price are major influences on available cash.

Hired labor. This included wages, social security and workers' compensation insurance, plus any other cash paid to labor. Much of the labor on dairy farms is furnished by the farm operator and members of the family and is not included in cash expenses unless a child or other family member was actually paid cash. Hired labor expense was 11 to 14 percent of cash expenses for these farms.

Machinery operation. The cash items were repairs and fuel for farm machinery, including trucks, plus the farm share of the automobile. The cash cost of custom hired or leased machinery was included. Machinery was 15 to 19 percent of total expenses.

Building upkeep. This included repairs and insurance on buildings, fences, tile drains and other farm improvements that are a part of the real estate. Also included is conservation expense, which includes bulldozing fence rows, cleaning ditches, etc. Building upkeep was 3 to 4 percent of cash expenses.

Crop production. This included the cost of fertilizer, lime, seed, herbicides, irrigation fuel and crop marketing. It was 15 to 17 percent of cash costs.

Purchased feed. This was mainly grain and protein supplement but also included salt, minerals and calf feed. It varied with the crops planted and local feed prices. It was 21 to 24 percent of cash costs for these farms over the three-year period studied.

Livestock. The largest item in this category was milk marketing, which cost 70 to 78 cents per hundredweight

Table 1. Yearly cash farm income and expenses by milk per cow, dairy Telfarms, Michigan, 1982-1984, averaged.

Item	Pounds of milk sold per cow						
	Less than 12,000	12,000 to 12,999	13,000 to 13,999	14,000 to 14,999	15,000 to 15,999	16,000 to 16,999	17,000 and over
Cash Income:							
1) Milk	\$101,993	\$118,089	\$151,107	\$174,549	\$185,641	\$188,157	\$245,743
2) Livestock	13,116	16,798	19,130	20,623	23,648	25,011	31,895
3) Crops	8,997	12,287	13,474	14,981	16,641	17,903	13,438
4) Capital sales (non-livestock)	3,091	614	1,585	1,059	4,996	1,370	1,525
5) Other	6,909	8,381	8,854	8,298	8,041	6,725	8,016
6) Total income	\$134,106	\$156,169	\$194,150	\$219,510	\$238,967	\$239,166	\$300,617
Cash Expenses:							
7) Hired labor	\$ 9,244	\$ 12,426	\$ 13,860	\$ 16,530	\$ 17,118	\$ 19,905	\$ 26,652
8) Machinery operation	15,880	19,073	22,295	23,349	24,123	23,986	29,100
9) Building upkeep	3,152	3,974	4,824	5,516	5,399	5,385	6,722
10) Crop production	13,038	16,035	20,312	23,525	24,893	25,660	28,594
11) Purchased feed	18,358	22,839	27,897	30,054	35,180	33,980	46,459
12) Livestock production	10,338	12,378	17,547	20,805	22,579	23,168	31,226
13) Other	13,890	17,794	18,630	21,853	21,812	23,308	27,884
14) Total expenses	\$ 83,900	\$104,519	\$125,365	\$141,632	\$151,104	\$155,392	\$196,637
15) Cash Difference	\$ 50,206	\$ 51,650	\$ 68,785	\$ 77,878	\$ 87,863	\$ 83,774	\$103,980
(Net cash income)							

of milk sold. Other items were breeding fees, veterinary fees, medical supplies and milkhouse supplies. Livestock production was 12 to 16 percent of cash costs.

Other expenses. The main items were real estate taxes, land rent (cash paid) and utility bills. It also included a miscellaneous "catchall" that may amount to 2 to 4 percent of total cash expenses. The other expense category was 14 to 17 percent of cash expenses.

Interest expense. Cash interest paid was not included as a cash expense item in Table 1. In the debt servicing capacity format, the residual amount being calculated is the cash available for debt servicing, or cash interest and principal amounts. If we count cash interest as an outgoing expense item, the true amount left for principal and interest payment will be underestimated.

Net cash income. This is the difference between cash income and cash expenses. It is the amount from which living expense, income taxes, debt servicing and savings must be made. It may contribute to new capital expenditures, but a large part of these expenditures are made with borrowed funds.

Some Facts About the Farms

The data in Table 1 came from Michigan dairy farmers who chose to keep their annual financial records on Telfarm, a computer-based accounting system sponsored by the Michigan State University Cooperative Extension Service. A dairy farm record was included in the study if the records were complete for either 1982, 1983 or 1984. The records were divided into the seven production levels,

and all records for each production level were averaged regardless of the year.

Of the 1,017 farm records summarized in Table 1, 438 were for 1982; 284 were for 1983, and 295 were for 1984. The average is weighted toward 1982, but that should not be a problem. Though the overall price paid index was increasing over the three years, 1982 milk prices and some feed prices are between the higher prices of 1983 and the lower prices of 1984. Also profit levels in dairy farms for 1982 were similar to those in 1983 and 1984.

The average production within each group was close to the midpoint. For farms with 17,000 pounds or more of sales, the group average was 18,333. Table 2 gives more information about the sample farms. The table indicates a trend for the production groups. As the pounds of milk per cow increase, there is an associated increase in the numbers of cows, tillable acres and person equivalents on the farm.

Remaining cash per cow. To remove size differences, the last line in Table 1 was divided by the cow numbers in Table 2. The result is the net cash farm income per cow in the second column of Table 3. The family cash living expense was estimated as the sum of the operator's labor and the unpaid family labor times \$5 per hour. This amount per farm ranged from \$25,276 to \$28,046. From this, the family had to buy food and life insurance, maintain the family dwelling, operate the family automobile, pay social security payments, medical expenses and income taxes, plus any other expenses not chargeable to the farm business. The family cash living expenses per cow are shown in column 3 of Table 3. The

cash available for debt servicing or capital investment is calculated by subtracting family living expenses from net cash farm income. Table 3 shows that, on the average, farms with higher milk sales per cow have more money left for debt servicing or for making capital purchases.

Capital purchases. These are items such as land, buildings constructed, machinery, and heifers or cows purchased. Machinery is often purchased each year to replace worn out or obsolete items already on the farm. Real estate items may be purchased only once every 5 to 10 years on an individual farm. The average amount of capital purchases per cow by milk production is given in the middle column of Table 4. In the Telfarm sample, it is not possible to show whether the capital purchases were made by using cash withdrawals from the business, by borrowing cash or by some combination of cash withdrawals plus borrowings. The last two columns of Table 4 indicate that all production groups in the Telfarm sample had enough cash left to cover capital purchases without borrowing additional funds. This assumes no cash has been paid on principal or interest. There was a large drop in the dollars spent per cow on capital purchases from 1980-1981 to 1982-1984. The debt position on many dairy farms may leave little cash available after debt servicing, so there is little room for cash purchases of capital or new debt servicing.

Debt servicing. We expect that many farmers with lower producing herds used borrowed money to cover at least a portion of their capital purchases. We also expect that several farms within the highest milk production groups did also. To illustrate the maximum amount of debt a dairy farm can repay, we'll now assume that all capital purchases were made with borrowed funds. Of the cash available for debt services or capital purchases, none will be used for capital items and all will be used for debt servicing.

The dollars in the fourth column of Table 3 will be used for annual payments of interest plus principal repayment. The size of loan that can be repaid, or carried, with a given amount of annual payment depends on the interest rate and the length of time given to repay the principal.

Table 5 gives the factors for calculating the size of loan that can be paid off with equal annual payments if the interest and length of time are known. To illustrate, the average cash available for interest and principal payments for sample farms with 12,000 to 12,999 pounds of milk sold is \$375 from Table 3. If money is borrowed at 13 percent interest to be paid back in 10 equal annual payments, the factor from Table 5 is 5.43; multiply \$375 by 5.43 and get \$2,036. This says the maximum debt a cow producing around 12,500 pounds of milk can repay is \$2,036. If there are 40 cows at this production level, the maximum farm debt should not exceed \$81,440. For an individual farm, we'd expect the cash available for interest and principal payments would have

Table 2. Number, size and labor force, dairy Telfarms, Michigan, 1982-1984, averaged.

Pounds of milk sold per cow	Number of farms	Number of cows	Pounds of milk sold per cow	Tillable acres owned and rented	Person equivalents
Less than 12,000	113	69	10,915	352	2.23
12,000 - 12,999	91	70	12,432	368	2.42
13,000 - 13,999	119	83	13,507	422	2.63
14,000 - 14,999	172	90	14,476	434	2.78
15,000 - 15,999	181	89	15,500	440	2.79
16,000 - 16,999	137	85	16,513	437	2.85
17,000 & over	204	101	18,333	466	3.31

Table 3. Cash income less estimated family living expense, dairy Telfarms, Michigan, 1982-1984, averaged.

Pounds of milk sold per cow	Per cow		
	Net cash farm income	Family cash living expense	Cash available for debts or capital
Less than 12,000	\$ 728	\$ 366	\$ 362
12,000 - 12,999	738	363	375
13,000 - 13,999	829	326	503
14,000 - 14,999	865	296	569
15,000 - 15,999	987	310	677
16,000 - 16,999	986	302	684
17,000 & over	1,030	278	752

Table 4. Cash available for capital purchases and debt servicing, dairy Telfarms, Michigan, 1982-1984, averaged.

Pounds of milk sold per cow	Per cow		
	Cash available for debts or capital	Capital purchases made per year	Balance above capital purchases
Less than 12,000	\$362	\$298	\$ 64
12,000 - 12,999	375	255	120
13,000 - 13,999	503	369	134
14,000 - 14,999	569	390	179
15,000 - 15,999	677	444	233
16,000 - 16,999	684	391	293
17,000 & over	752	454	298

to be divided among two or three loans, each with its own interest rate and repayment period.

Debt payment as a percent of milk sales. A common rule of thumb for dairy farms has been that debt payments should not exceed 25 percent of the milk check if the farm is to meet all other expected cash demands. Table 6 shows how this works out on sample Telfarms. The cash milk income was calculated from Tables 1 and 2. The cash available for debts or capital was taken from Table 3 and results from the total farm operation shown as a per-cow value. Table 6 shows that once 14,000

Table 5. Size of loan \$1 per year will repay by repayment time and interest.

Years to repay loan	Annual percentage rate		
	11%	13%	15%
1	.90	.81	.87
2	1.71	1.67	1.63
3	2.44	2.36	2.28
4	3.10	2.97	2.86
5	3.70	3.52	3.35
6	4.23	4.00	3.78
7	4.71	4.42	4.16
10	5.89	5.43	5.02
12	6.49	5.92	5.42
15	7.19	6.46	5.85
20	7.96	7.02	6.26
25	8.42	7.33	6.46
30	8.69	7.50	6.57
40	8.95	7.63	6.64

pounds of milk sold per cow is reached, the percentage stays at about 30. If all bills were paid and the family living held at the assumed levels, these sample farmers selling 13,000 pounds of milk per cow or more had 25 to 30 percent of the milk check available for principal plus interest payments. This assumes all capital purchases are made with borrowed money. The average price per cwt. of milk for our Telfarm sample was \$13.39. If milk prices were to fall and if expenses and other income remain the same, the percent of cash available would fall. If expenses fell as well as milk prices, the percent of cash available could remain the same, but the percent would represent fewer actual dollars available.

Example calculation. Using the data from Table 1 for farms averaging 13,000 to 13,999 pounds of milk sold per cow, the livestock sales of \$19,130 plus capital sales (non-livestock) of \$1,585 are entered as "Capital items sold." Most of this amount was from cull cow sales. The remaining income items of milk, crops, etc., were combined and entered as "Items produced to sell." The \$173,435 and \$20,715 were added together, giving \$194,150 as "Total cash in." The total cash expense on line 14 of Table 1 was entered as "Cash expense items." Family living and income tax cash expenses were estimated to be \$27,066 and entered as "Family living needs." The \$125,365 and \$27,066 were added together getting \$152,431 entered as "Total cash out." The \$152,431 was subtracted from the \$194,150, leaving \$41,719 as "Available for debt servicing." If the farm could borrow all needed money at 13 percent, paying it off over 10 years with equal annual payments, the fac-

Table 6. Debt payment capacity as percent of milk sales per cow, dairy Telfarms, Michigan, 1982-1984, averaged.

Pounds of milk sold per cow	Per cow		
	Cash milk income	Cash available for debts or capital	Cash available as per- cent of income
Less than 12,000	\$1,478	\$362	24
12,000 - 12,999	1,687	375	22
13,000 - 13,999	1,821	503	28
14,000 - 14,999	1,939	569	29
15,000 - 15,999	2,086	677	32
16,000 - 16,999	2,214	684	31
17,000 & over	2,433	752	31

tor would be 5.43 (found in Table 5). Multiplying 5.43 times \$41,719 gives \$226,534.17—this is the maximum loan one could expect to repay safely from farm earnings.

Debt Servicing Capacity

Cash flowing in	
Items produced to sell (milk, crops, calves)	\$173,435
Capital items sold (cull cows, machines)	\$ 20,715
Total cash in	\$194,150
Cash flowing out	
Cash expense items (excluding interest)	\$125,365
Family living needs (owner or partners)	\$ 27,066
Total cash out	\$152,431
Available for debt servicing (Cash in minus cash out)	\$ 41,719

Summary

This fact sheet was developed to show the reader how to calculate debt servicing capacity for a dairy farm business and how debt servicing capacity varied with milk sold per cow on specialized dairy Telfarms, and to encourage the readers to estimate the amount available on their own farms. Managers selling below 13,000 pounds of milk per cow per year should keep their debt servicing below 25 percent of milk sales. Prudent financial managers selling 14,000 pounds or more of milk per cow per year should keep their total annual payments of interest plus principal repayment below 30 percent of total dollars received from milk sales.



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