

Economics of Dairy Herd Management

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The objectives of this paper are to characterize the income and expense situation on Midwestern dairy farms and to show the effects of size of operation, level of output, and herd health on dairy income.

Income and Expense Characteristics for Michigan Dairy Herds

The values shown in Tables 1 and 2 are averages for Telfarm cooperators in 1970. Telfarm is a computerized, mail-in farm account system maintained by the Agricultural Economics Department at Michigan State University. Those farms included are specialized Southern Michigan dairy farms that receive at least 80 percent of their income from the sale of dairy products and cattle.

Three sizes of dairy farms are included in the tables. Table 1 shows that the total investment for herds averaging 25, 60 and 140 cows is \$96,500, \$176,800 and \$343,000, respectively. As with most accounting systems the inventory values for land and cattle are conservative and below market value. The investment in improvements and buildings is the depreciated value.

Table 1

Investment and Farm Characteristics of Southern Michigan Specialized Dairy Farms Enrolled in Telfarm, 1970.

	Average number of cows		
	25	60	140
Number of farms	35	118	46
Investment, total	\$96,500	\$176,800	\$343,300
Land	47,100	71,800	129,400
Improvements	14,100	32,700	68,300
Machinery	15,000	28,500	52,200
Livestock	11,700	28,300	63,300
Feed	8,600	15,500	30,100
Number of men	1.3	2.0	4.0
Tillable acres	180	270	490
Price received for milk	\$5.95	\$5.94	\$5.94

Capital requirements for dairying are high and are rising. The average total investment for all specialized Southern Michigan dairy herds in the Telfarm project rose from \$142,800 in 1967 to \$241,400 in 1971. This 69 percent increase in total investment has been accompanied by a 31 percent increase in herd size during the five year period.

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It is often convenient to associate an investment value on a per cow basis with dairy farms. Such a "thumb rule" for investment needs has its merits, but it must be tempered with the realization that the investment per cow is highest on small dairy farms. For the three groups in Table 1 this investment per cow is \$3,860, \$2,946 and \$2,450 for herd sizes of 25, 60 and 140 cows.

Midwest dairymen normally produce the feed needed for their herds. The high percent of the total investment in land is indicative of this practice. Further, those with small dairy herds receive a higher percent of their income from the sale of crops and maintain more acres per cow.

The income and cash expenses for these herds are shown in Table 2. The values are particularly meaningful in furnishing a knowledge of the income and expenses encountered in dairy farming. The net income represents the income that is available for debt accounts, capital purchase and

Table 2

Income and Costs for Southern Michigan Specialized Dairy Farms Enrolled in Telfarm, 1970*

	Average number of cows		
	25	60	140
Income			
Milk sales	\$19,300	\$45,900	\$102,300
Livestock income	4,400	7,900	14,500
Crop sales	5,100	6,100	8,800
Government programs	700	400	1,100
Custom, refunds, etc.	500	500	1,000
Gross Income	\$30,000	\$60,800	\$127,700
Cash expense			
Hired labor	\$ 1,300	\$ 3,800	\$13,300
Machinery expense	2,800	5,300	10,600
Improvement expense	900	2,200	4,600
Crop expense	3,000	5,000	10,000
Livestock costs	2,400	5,800	12,800
Land charge	1,900	3,100	6,900
Purchased feed	2,300	6,800	16,200
Other	700	1,500	3,200
Total Cash Expense	\$15,200	\$33,500	\$77,600
Returns			
Net Income*	\$14,800	\$27,300	\$50,100

*Income available for family living, debt accounts, capital purchases, income tax and savings.

income tax as well as for family living and savings. The figure should not be thought of as profit. For example, on the 60 cow herds, debt repayments and capital purchases were \$13,000, leaving a balance of \$14,300.

Herd Size and Labor Income.

One of the more important factors affecting income is size of operation. In Table 3, dairy herds on the Telfarm project are grouped according to size of herd. The average labor income and return on investment for these herds is shown. Labor income may be defined as the return for operator's labor after all cash expenses, depreciation, charge for family labor and five percent return on owned assets have been deducted.

Table 3
Labor Income and Rate Earned on Investment
as Affected by Herd Size

Average Number of Cows	Labor Income	Rate Earned on Investment
25	6,140	3.5
40	6,650	4.5
60	10,060	6.8
85	13,080	7.8
140	18,020	9.2

Labor income rose from \$6,140 for 25 cow herds to \$18,020 for 140 cow herds. The rate earned on investment increased in like manner from 3.5 to 9.2 percent.

Milk Production and Labor Income.

Level of milk production is one of the important factors affecting income. A study of the financial records of 389 southern Michigan Holstein herds indicated that the average dairyman selling less than 11,000 pounds of milk per cow was not covering his costs. These costs include his own and family labor at \$2.50 per hour and equity investment at five percent.

A summary of 1970 income and cost figures grouped according to level of milk sales is shown in Table 4. Herds were grouped at 1,000 pound intervals from under 10,000 to those over 15,000 pounds of milk sold per cow. The income and cost figures are for the dairy enterprise. The cropping part of farm operation is not included in the values shown. This system of enterprise analysis permits an identity of the returns from the dairy herd separate from those for crop production. Feed produced on the farm is charged to herds at market price.

Values shown for income include those from both milk and cattle. Price of milk for these farms averaged \$5.94 per hundred weight. Obviously,

more milk per cow means more gross income per cow.

Cattle income includes the difference between sales and purchases, plus any change in inventory. There was a general increase in cattle income, from \$87 to \$173 per cow, from the lower to the higher producing groups. Higher producing herds had greater cattle purchases, higher prices received for some of the cattle sold, and a slightly higher inventory value placed on cattle retained in the herd.

The greater income of the higher producing herds results, then, from both more milk sold and an increased income from the cattle sold.

At each level of production feed accounted for about half of the cost of milk production. Greater feed disappearance goes along with higher milk production. A man striving for high production needs to develop ways of getting large quantities of feed into good cows.

Labor was the next largest expense and accounted for over 40 percent of the non-feed cost. Higher producing herds have the greatest labor requirement. Herds selling over 15,000 pounds of milk per cow averaged 77 hours of labor per cow and replacement. The next group of herds, those averaging 14,532 pounds of milk, needed 71 hours per cow and replacement. The remaining production groups each required 69 hours of labor per cow.

Nearly every expense increased slightly as production went up. There was an increase in veterinary and medical expense with increasing production. Veterinary and medical costs on a per cow basis for the seven production groups were \$6.82, \$8.82, \$11.37, \$12.67, \$13.94, \$14.48, and \$21.37, respectively.

At less than 11,000 pounds of milk sold per cow, returns over total costs were negative. It must be remembered that these values are averages and some dairymen at these lower production levels showed a positive return after allotting \$2.50 per hour for operator and family labor. But others were well below the average returns of -\$94 and -\$24 for the two low production groups.

In the cost figures in Table 4, operator and family labor were charged at \$2.50 per hour. If the accounting system is now altered and operator's and family labor is not charged as an expense, but rather all other expenses, including return on owned assets, what's left becomes a wage. Since hours involved are known it is a simple matter to list returns in terms of wage per hour of operator and family labor.

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of \$6.7 million, but continuing inflation would affect that estimate. Construction will take about a year. Target date for completion is 1975.

Officials stress that the new center's operation will not conflict with the regular animal import centers located at Clifton, N.J., Miami, Fla., and San Francisco, Calif. These stations will continue to handle animal imports from countries where foot-and-mouth disease does not exist.

In the meantime, importation of semen from exotic breeds continues. As an indication of the scope of this activity, in 1972 importations of cattle semen from these breeds amounted to approximately 2.2 million ampules. Two thirds of this amount came from Canada. Imports also were received from Italy, Germany, France, Australia, and Switzerland.

Of the exotic breeds represented, Limousin topped the list, followed closely by Simmental, then Chianina, Maine Anjou, Murray-Gray, Devon, Salera, Welsh Black, Gelvich, Norman, Blonde Aquitaine, and Lincoln Red.

Of course, semen can not be imported at the risk of introducing a livestock disease or pest not now in this country. Frozen semen, for instance, provides a specially favorable medium for preserving infectious agents for undetermined periods of time and for potentially world-wide distribution. A single bull can be the source of 100,000 ampules of semen a year.

Because of the potential danger of such wide distribution of infection, USDA has established

regulations that must be met before semen is allowed to be imported into this country. Semen cannot be imported from countries infected with rinderpest or foot-and-mouth disease unless certain conditions are met. For instance, semen collections must be under the supervision of an APHIS veterinarian. This includes inspection at the farm-of-origin, checking for isolation, taking blood samples, shipping to the United States, testing at USDA's Plum Island Animal Disease Laboratory, storing under quarantine, and ultimate release. The bull also must be tested for such diseases as tuberculosis, brucellosis, and contagious bovine pleuropneumonia.

USDA has also been considering for some time the desirability of regulations which would set standards for donor sires whose semen would be shipped interstate. After consultation with leaders in the U.S. cattle industry, USDA published a proposed regulation in the September 30, 1970, Federal Register. Under this proposal, donor sires must be free from evidence of communicable diseases and pass a physical examination given by an accredited veterinarian within 60 days of the first semen collection. Numerous comments—both for and against—were received from interested parties, including suggestions for improvement. The proposal is under review.

With construction of the new animal import center at Fleming Key and with continued importation of semen from exotic breeds, officials foresee far-reaching benefits for the U.S. cattle industry and for the U.S. consumer.

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Dairymen with herds in the lowest production group received an average wage of 81 cents per hour. From there the wage moved steadily upward to \$4.71 for herds averaging 14,532 pounds of milk sold per cow. Dairymen in the top production group received a slightly greater return per cow, but the additional hours required to get this return caused the wage rate to taper off.

Obviously, it isn't a simple matter to achieve these higher levels of milk production. If it were, a great many more dairymen would have herds producing at high levels. Skill, rate of expansion, an individual's starting point, the willingness to work, disease and capability of those in dairy service organization and consulting roles all enter the picture. Yet the fact that many are there indicates that it is possible.

Table 4
Effect of Level of Milk Sales on Returns to the Dairy Enterprise*
389 Southern Michigan Holstein Herds on Telfarm, 1970

	POUNDS OF MILK SOLD PER COW						
	Under 10,000	10,000-10,999	11,000-11,999	12,000-12,999	13,000-13,999	14,000-14,999	15,000 and Over
Number of farms	23	44	72	96	84	44	26
Ave. Pounds milk sold/cow	8,976	10,587	11,464	12,512	13,424	14,532	15,762
Number of cows	62	58	71	62	64	59	55
Income/cow							
Milk and cattle sales	\$628	\$721	\$797	\$891	\$916	\$990	\$1,103
Cost/cow							
Total nonfeed	366	390	384	411	412	436	492
Feed disappearance	356	355	394	414	427	440	495
Total cost	\$722	\$745	\$778	\$825	\$839	\$876	\$987
Returns/cow							
"Wage" per hour of operator and family labor	\$0.94	\$0.24	\$19	\$66	\$77	\$114	\$116
	\$0.81	\$2.05	\$2.91	\$3.82	\$4.23	\$4.71	\$4.61

*Income and cost figures include those charged to cow herd and dairy replacements.