Cooperative Extension Service

Dairy Planning Guide

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R.L. Orth and M.F. Hutjens

Iowa State University and University of Illinois

APPROXIMATELY FIVE YEARS AGO, the interest in dairying was renewed because milk prices were favorable in relation to expenses. For the first time since the mid-forties, the number of cows had stopped declining in 1980 and in fact had increased slightly. More recently, as numbers of cows and production per cow have increased, more milk has been produced in the United States than has been consumed. Milk prices have therefore decreased, whereas production costs have continued to climb. This trend is likely to continue for the next several years.

This guide is intended to help producers decide whether to stay in dairying; and if so, whether they should modernize, expand, or both. Planning information is provided for all three situations.

CONTINUING IN DAIRYING

On a short-term basis, dairy producers must cover their feed and other cash costs. However, cash costs vary widely from farm to farm because of differences in the age and cost of facilities. Dairying is more profitable for some producers than others because they are using low-cost facilities or those that are fully depreciated. Producers with herds at or below the state average for milk production are likely to receive below-average returns for labor, to let their facilities deteriorate, or perhaps both.

EXPANDING OR BUILDING NEW FACILITIES

Herd sizes have been increasing over the last 30 years. This trend will continue. When considering expansion, the dairy producer needs to know whether the industry has a surplus, is in short supply, or is stable. The specific condition could change profit margins. The dairy industry competes with other enterprises for the use of resources. Dairy producers must therefore take into consideration the following factors.

Resources. Land, labor, and capital are all needed for successful dairy production. The operation should be adequate in size and free from large debts. The dairy producer should have an ample source of family labor or the opportunity to hire outside labor. An adequate supply of feed—either raised or purchased—is another requirement. Most dairy producers prefer to raise the forage they need.

Location. Access to a stable market (preferably Grade A) is essential. Dairy farms in sparsely populated dairy regions may have higher costs associated with dairy production, such as milk hauling.

Management. The successful dairy producer must have the ability to assemble and use available resources in order to care for cattle and produce milk efficiently. Some production and management goals are as follows:

- An annual average in milk production for the herd of 14,000 pounds per cow or more, or its equivalent milk value if a higher test breed is milked.
- A total of 500,000 to 600,000 pounds of milk produced annually per worker or family unit.
- A herd of 35 to 40 cows with replacements per family unit.
- An average calving interval of 13 months or less.
- An average of 90 percent or higher in raising calves.
- Herd average somatic cell count (SCC) under 300,000 cells per milliliter.

Drawbacks of Expansion

Expansion presents certain problems. In a Michigan study involving 47 herds, dairy farmers experienced greater difficulties with animal health, heat detection, manure handling, labor management, and other types of management problems after expanding. Milk production per cow decreased by an average of 900 pounds after expansion, but moved above preexpansion levels by the fourth year. Cash-flow problems were experienced to some degree by 68 percent of the expanded dairy operations, persisting for an average of two years. The farms that were expanded rapidly experienced bigger declines in milk production and greater cash-flow and operational problems than those expanded gradually.

Minnesota dairy specialists have followed expansion changes with various facilities and have compared production levels. Figure 1 shows the effects of changes in facilities and expansion on production levels over several years. Dairy producers should keep these factors in mind when considering plans for expansion and for new facilities.

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North Dakota State University Fargo, North Dakota 58105

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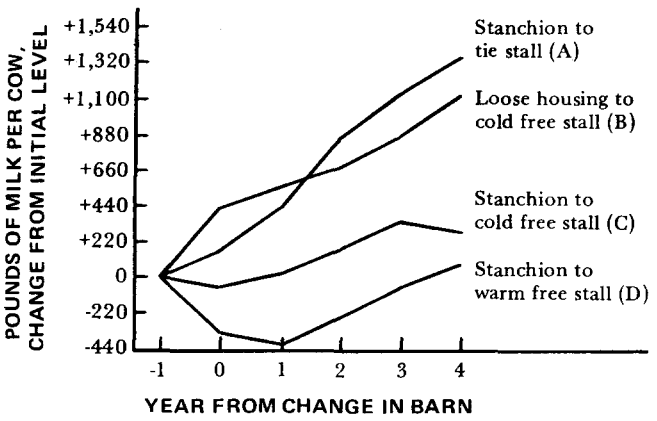

(A) 106 herds changing from 36 to 54 cows/herd.
(B) 24 herds changing from 52 to 70 cows/herd.
(C) 43 herds changing from 38 to 71 cows/herd.
(D) 19 herds changing from 42 to 76 cows/herd.

Effects of expansion and facility changes on milk production in a period of 5 years. (Fig. 1)

The budgets used in this guide indicate that an annual production level of 16,000 pounds per cow or more is necessary in order to justify investments in new facilities that will yield the desired returns on labor and capital as well as repay the debt.

The expansion-minded dairy producer should consider several other factors, too, such as age, health, and financial situation; in addition, the following questions should be asked: How good are the present facilities? Is labor available? Would it be more profitable to make the dairy operation better instead of bigger? Fewer but better cows can have an important impact on returns to labor and management, as can be seen below:

Production level	Returns to Labor and management	Number of cows needed to return $16,000 to labor and management
pounds	*dollars*	*cows*
12,000	12	1,333
14,000	152	105
16,000	295	54
18,000	441	36

PLANNING INFORMATION

Producers need a great deal of information when projecting future income and expensed budgets. Four sample budgets for a cow and her replacement are given in Table 1. Pounds of milk sold vary from 12,000 to 18,000 pounds. A typical budget for raising replacements appears on page 3. Average costs for midwest dairy farms are used. Your own figures will probably be somewhat different. Space is provided for your own figures.

Cash Income. This includes net sales of milk at $12 per hundredweight and animal sales calculated as follows: cull cows—1,300 pounds times 28 percent times $44 per hundredweight; bull calves—45 percent times $100; and heifers, 9 percent times $800, 1,000, 1,200 and 1,400 at the four production levels. Make the necessary milk price adjustments for high milk solids and quality milk premiums.

Variable Expenses. These include out-of-pocket cash costs and home-produced items that relate directly to dairy cows and their replacements. These costs vary by herd size and production level and also by the kind and amount of technology used.

Home-Produced Resources. The annual feed requirements per cow and for her replacement (about 0.8 replacement per dairy cow) used in the example are shown in Table 1. The prices used in the examples are: corn, $2.85 per bushel; hay equivalents, $80 per ton; and corn silage, $26 per ton.

Purchased Feeds. The example assumes 35 pounds of milk replacer per heifer calf raised at $45 per hundredweight. Protein supplement is priced at $12 per hundredweight. (See Table 1 for the amounts of protein used in the example calculations.)

Breeding Fees. Artificial insemination is listed at $23 to $29 per cow unit, or at the prorated cost of raising or maintaining a herd sire. The costs increase with production levels in the example to allow for higher-priced sires.

Health. This category includes medicine, spray, and veterinary services, both emergency and herd health programs.

Accounting and Testing. These costs include the animals on DHI (AM-PM or OS) and accounting services such as tax preparation.

Supplies and Miscellaneous. The items covered include towels, detergents, and other supplies. No veterinary services are included.

Table 1. Annual Feed Requirements for a Milk Cow and Her Replacement

	Annual milk production (lb.)							
	12,000		14,000		16,000		18,000	
	Day[a] (lb.)	Year[b] (T.)	Day[a] (lb.)	Year[b] (T.)	Day[a] (lb.)	Year[b] (T.)	Day[a] (lb.)	Year[b] (T.)
Hay crop	12	3	12	3	12	3	12	3
Corn silage	55	12.3	55	12.3	55	12.3	55	12.3
Pasture, hay equivalent[c]		.8	11	.8		.8		.8
Corn equivalent	8	2.5	11	3	14	3.5	17	3.75
Protein supplement	.5	.16	1	.25	1.7	.33	2.5	.5

[a]Average amount of feed per day to dairy cow only. [b]For annual totals, both cows and their replacements are figured. Replacement animals need approximately 30 percent of the feed required for adult animals. [c]For replacement heifers only. If more or less pasture is used, subtract or add the hay equivalent from pasture to the hay or corn silage tonnage requirement. [d]35.7 bushels per ton of shelled corn.

ESTIMATED AVERAGES FOR COSTS AND RETURNS
(Per cow unit with replacement)

					Your Farm
CASH INCOME					
Milk sold (pounds)	12,000	14,000	16,000	18,000	
Milk price ($12 net per/cwt.)	$ 1,440	$ 1,680	$ 1,920	$ 2,160	
Cull cow and calf sales	266	284	302	320	
TOTAL	$ 1,706	$ 1,964	$ 2,222	$ 2,480	
VARIABLE EXPENSES					
Feed costs					
Corn equivalent	$ 254	$ 305	$ 356	$ 382	
Hay crop	240	240	240	240	
Corn silage	320	320	320	320	
Pasture	64	64	64	64	
Protein	38	60	79	120	
Salt and minerals	12	13	14	15	
Calf starter and milk replacer	17	17	17	17	
TOTAL	$ 945	$ 1,019	$ 1,090	$ 1,158	
Other costs					
Breeding	$ 23	$ 25	$ 27	$ 29	
Health and veterinary services	39	42	45	48	
Accounting and testing	19	20	21	22	
Utilities, power, and fuel	66	68	70	72	
Supplies and miscellaneous	42	42	42	42	
Bedding	15	15	15	15	
Repairs on maintenance machinery and equipment	53	53	53	53	
Hired labor	...	...	...	...	
TOTAL	$ 257	$ 265	$ 273	$ 281	
TOTAL, FEED AND OTHER COSTS	$ 1,202	$ 1,284	$ 1,363	$ 1,439	
FIXED COSTS					
Returns to labor and management facilities and livestock	$ 504	$ 680	$ 859	$ 1,041	
Fixed or capital costs					
Land and buildings	$ 150	$ 150	$ 150	$ 150	
Equipment and machinery	198	198	198	198	
Livestock	144	180	216	252	
TOTAL	$ 492	$ 528	$ 564	$ 600	
TOTAL COSTS EXCEPT FAMILY LABOR	$ 1,694	$ 1,812	$ 1,927	$ 2,039	
RETURN TO LABOR AND MANAGEMENT	$ +12	$ +152	$ +295	$ +441	
Return @ $11/cwt for milk	$ -108	$ +12	$ +135	$ +261	
Return @ $13/cwt for milk	$ +132	$ +292	$ +455	$ +621	

Utilities, Power, and Fuel. The dairy's share of electricity, fuel, and oil for livestock equipment and for machinery usage, including the costs for such items as a pickup truck.

Bedding. Requirements vary with the waste-management system from 500 pounds to 1.5 tons. For the examples on page 3, 2,000 pounds at $30 per ton, minus $15 manure credit was used.

Machinery and Equipment Repair. This category covers upkeep and repair on dairy equipment and the machinery used for dairy purposes.

Hired Labor. Included are the costs for hired labor used by the dairy enterprise, if applicable. (None is used in the examples.)

Returns to Labor and Management, Facilities, and Livestock. This is the amount remaining after paying direct cash costs and deducting the market value for home-produced feeds and bedding. This money is available to cover interest and principal payments, capital purchases, cost of upkeep and repair, taxes, insurance, and to provide family income.

Fixed or Capital Costs. These include depreciation, interest, insurance, and taxes on buildings, lots, equipment, and machinery. These costs will continue regardless of whether production takes place. Part of the costs (such as interest paid, insurance premiums, and taxes) could be included in the cash costs. Depending on producer equity, some or all of this amount could be available for debt expenses, savings, and family living costs. The example shows: land and buildings—$1,000 times 15 percent; equipment and machinery—$1,100 times 18 percent; livestock—$1,200, $1,500, $1,800, or $2,100 at 12 percent; and machinery (dairy share)—$200 times 10 percent.

Returns to Labor and Management. This figure shows how much income is available for labor and management, using the income and expense figures above. Average number of hours of labor required with various types of facilities are given in Table 2.

Return at $11 and $13 per Hundredweight of milk. Other prices stay the same.

Annual Costs per Cow. If expansion is being considered, determine the annual costs per cow. Facility and equipment costs can vary widely. When considering new or expanded facilities, calculate the annual costs per cow per year. Costs are higher when a facility is not used to capacity. Some of the investment cost may reduce labor needs, bedding requirements, and other costs. Dairy producers must be able to produce at high levels of milk yield per cow, have lower expenses than shown, or be satisfied with low hourly income during the next several years.

Table 2. Typical Hourly Labor Requirements Per Cow Unit

	Number of cows in herd		
	40	75	100
Stanchion, conventional	85	..	..
Stanchion, mechanized	74	65	60
Free stall and parlor	65	50	40

REPLACEMENT HEIFER BUDGET

A replacement heifer budget is divided into three separate age categories (Table 3). The total replacement heifer cost is $1,350. The following assumptions were used in building the budget.

- Age at first freshening was 26 months.
- Heifer culling rate was 12 percent.
- Mortality rates for various age groups were 15 percent (0-3 months), 2 percent (3 to 12 months), and 1 percent (12 to 24 months).

These assumptions increased costs 15 percent for 0 to 3 months, 7.5 percent for 3 to 12 months, and 6.5 percent for 12 to 24 months. Other items to consider than those outlined in this budget include maintenance of a certain genetic level in the replacement herd, disease considerations, and the use of resources such as facilities, feed, and labor, which might otherwise go unused or underutilized.

Table 3. Replacement Heifer Budget

Item	0-3 months value	3-12 months value	12-24 months value
Feed			
Forage	$ 4.77	$ 95.79	$322.44
Corn	10.35	45.15	12.28
Soybean meal	8.34	15.66	3.09
Mineral	1.27	5.91	7.03
T.M. salt	0.16	1.65	1.86
Milk replacer	23.00	0	0
Total feed costs	$ 47.89	$164.16	$346.70
Other variable costs			
Bedding	5.75	18.28	23.43
Vet and medicine	9.20	6.45	8.52
Breeding	0	0	26.63
Power and fuel	4.60	8.60	7.45
Supplies	2.70	1.67	16.51
Overhead	2.30	6.45	8.52
Total other costs	$ 24.55	$ 41.45	$ 91.06
Interest	$ 9.41	$ 23.38	$ 28.48
Fixed costs			
Building	21.56	60.47	79.88
Equipment	15.53	43.54	57.51
Livestock	5.23	37.73	120.45
Total fixed costs	$ 42.32	$141.74	$257.84
Labor	$ 28.75	$ 48.40	$ 53.25
Total costs	$152.92	$419.13	$777.33

SOURCE: University of Wisconsin, A2731

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