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Animal Sciences

2029 Fyffe Road, Columbus, OH 43210-1095

The Economics of Heifer Contracting

AS-0006-00

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Is entering a heifer raising contract an economical alternative for a dairy producer and a heifer grower? What is a fair charge for raising a heifer? This fact sheet covers issues related to these questions by addressing three topics. First, typical costs for growing a heifer are provided, and then per day charges that cover a grower's costs are given. This information aids in determining a charge that provides a grower a reasonable return. Finally, how revenues and costs will change when entering a heifer raising contract are discussed. Ways of justifying the returns and costs also are presented.

This fact sheet emphasizes per day forms of heifer contracting. Under this form, the grower is paid a per day charge. The current range of the charge varies between $1.45 and $1.70 per heifer per day. A grower generally provides and pays for all feed, labor, facilities, and emergency health care, including costs incurred in the treatment of injury or illness. The producer generally pays for artificial insemination and routine veterinary services and supplies, including things such as vaccinations, parasite control, and other preventative health measures. This form is emphasized because it is the predominant form of heifer contracting and because the form is relatively easy to implement (see "Dairy Heifer Contracting: Motives, Forms, and Arrangements," AS-5-2000, for a discussion of other forms.)

Costs of Raising a Dairy Heifer

Table 1 shows costs of raising a heifer from 3 to 23 months of age, a typical period that a grower raises heifers. Costs shown in Table 1 are for a Holstein heifer and come from the 1999 Ohio Dairy Enterprise Budgets. The table only shows costs incurred by the grower. The dairy producer is assumed to pay some costs, such as breeding and registration. Total costs are shown in the Appendix.

Feed is the largest expense to the grower. The $643 of feed costs accounts for 63% of the total costs of growing a heifer. Given this high percentage, properly feeding heifers has a large impact on the grower's profitability.

The $643 of total feed costs equals an average of $1.00 per day. Per day feed costs depend on prices, with corn and hay prices having the largest impact on feed costs. Feed costs in Table 1 are based on $2.69 per bushel for corn and a $110 per ton for hay. A $0.50 increase in the corn price causes feed costs to increase by $0.03 per day (Table 2). A $20 per ton increase in hay price causes feed costs to increase by $0.10 per day (Table 2).

Growers do not have much control over feed prices; therefore, given that feed prices vary, per day charges also may have to vary. Otherwise, the grower may lose money during periods of high feed costs.

Labor costs in Table 1 are based on 17.5 hours of labor priced at $10.00 per hour. Hours per heifer tend to decline as more heifers are raised. For example, daily feeding and animal care do not change a great deal whether 40 or 60 heifers are being raised. Growers with more heifers can spread labor costs over more animals. As a result, growers raising smaller numbers of heifers will likely have to charge higher rates than growers with larger numbers of heifers.

Facility costs in Table 1 include equipment and building charges. These charges are based on new facilities and include costs for depreciation, interest, repairs, taxes, and insurance. These costs are useful guides for growers who either are building new heifer raising facilities or are planning on replacing existing heifer facilities. Facility costs will be lower for growers who have existing facilities and have no intentions of replacing those facilities. In such cases, facility costs will consist only of repairs and taxes.

Table 1 breaks down costs into subperiods. Per day costs are higher for the 13- to 23-month period than for the 3- to 12-month period. The increase is primarily due to higher feed costs. Per day feed costs equal $0.89 for the 3- to 12-month period and increase to $1.11 for the 13- to 23-month period. After one month of age, feed costs generally increase with the age of the heifer. By the 24th month, per day feed cost equals $1.19. Increasing costs give an incentive for growers to complete the growing process quickly. Growers tend to make higher profits on younger heifers than on older heifers when a per day charge is used.

Table 1. Heifer-raising costs incurred by the grower (3 to 23 months of age, Ohio,

1999).1			
	Costs by Period (months)		
	3 to 12	13 to 23	3 to 23
Feed Costs:			
Hay equivalent	140	197	337
Corn silage	63	87	150
Corn	43	60	103
Soybean meal	17	22	39
Salt/trace mineral	2	2	4
Dicalcium phosphate	5	5	10
Total Feed Costs	**270**	**373**	**643**
Other Variable Costs:			
Veterinary and medicine	4	9	13
Utilities	6	7	13
Bedding	24	24	48
Misc. and supplies	7	8	15
Total Other Variable Costs	**41**	**48**	**89**
Labor Costs	**80**	**95**	**175**
Facility Costs:			
Equipment charge	15	16	31
Building charge	37	41	78
Total Facility Costs	**52**	**67**	**109**
Total Costs	**443**	**573**	**1016**
Per Day Costs			
Feed costs	$0.89	$1.11	$1.00
Other variable costs	0.13	0.14	0.14
Labor costs	0.26	0.28	0.27
Facility costs	0.17	0.17	0.17
Total Per Day Costs	**1.45**	**1.7**	**1.58**

1 Costs were taken from the 1999 Ohio Dairy Enterprise Budgets given in the Appendix. Only costs incurred by the heifer grower were included in this table. Costs are for rearing one heifer.

Table 2. Per day feed costs based on differing corn and hay prices for a heifer from 3 to 24 months of age. 1

Hay Price	Corn Price ($/bushel)			
($/ton)	$2.00	$2.50	$3.00	$3.50
60	0.72	0.75	0.78	0.81
80	0.82	0.85	0.88	0.91
100	0.92	0.95	0.98	1.01
120	1.01	1.04	1.07	1.1

1Calculated using feed requirements in the 1999 Ohio Dairy Enterprise Budgets.

Charges to Cover Costs

The costs in Table 1 are used to examine the per day charges that adequately compensate the grower. These charges are summarized in Table 3. The "total" column lists categories of heifer-raising costs. Costs in the total column are taken from Table 1. The "per day charge" column lists per day costs for a 3- to 23-month period. The "per pound charge" was calculated by dividing total costs by an assumed 1,000-lb gain. This column is useful for examining charges if a per pound of gain contracting form is used.

The per day charge to cover feed and other variable costs for rearing a heifer is $1.14. If a per day arrangement is used, the dairy producer must pay the grower at least $1.14 per heifer per day. If the grower does not receive at least $1.14 per day, the grower does not cover variable costs. If variable costs are not covered, the grower will not have an economic incentive to raise heifers.

Variable costs will change as feed prices change. For example, an increase in corn price from $2.69 per bushel up to $3.50 per bushel will increase the charge to cover variable costs to $1.19. Two methods can be used to account for changes in feed prices. One method is to adjust charges received by the grower for changes in feed prices. Another method is to have a constant but higher charge. The higher charge builds in a safety margin to cover feed costs during periods of high feed prices and compensates the grower for bearing the risk of feed price changes.

Labor costs equal $0.27 per heifer per day (Table 3). The $0.27 per heifer per day may or may not be a cash cost to the grower. If the grower provides all the labor, the $0.27

represents a return to labor. If the grower has employees, some or all of the $0.27 represents a cash cost to the grower.

Facility costs add $0.17 to the per day charge (Table 3). As stated previously, the $0.17 covers depreciation, interest, repairs, taxes, and insurance costs of new facilities. Therefore, this charge will compensate a grower who has new facilities. A grower not planning on replacing existing facilities will have lower per day facility costs. In these cases, only repair and taxes on the existing facilities will have to be covered. Repair and tax costs usually account for about 25% of the facility costs. Therefore, facility costs may drop to $0.04 per heifer per day if the grower has old facilities and does not plan on replacing the facilities.

The total charge to cover variable, labor, and facility costs equals $1.58 per heifer per day (Table 3). The grower must receive at least this much compensation to cover costs. The break-even cost of $1.58 per day may vary depending on feed prices, labor requirements, and facilities. For example, the $1.58 reduces to $1.41 if corn prices fall from $2.69 to $2.00 and if facility costs a total $0.04 per heifer per day. Alternatively, the $1.58 charge increases to $1.63 if corn prices rise from $2.69 to $3.50 per bushel.

Table 3. Per day and per pound heifer-raising charges to cover various expenses for a heifer raised from 3 to 23 months of age.1

Item	Total	Per DayCharge2,3	Per PoundCharge
Feed Costs	$643	$1.00	$0.64
Other Variable Costs4	$89	$0.14	$0.09
Charge to Cover Variable Costs	$732	$1.14	$0.73
Labor	$175	$0.27	$0.18
Charge to Cover Variable and Labor Costs	$907	$1.41	$0.91
Facility Costs	$109	$0.17	$0.11
Charge to Cover Variable, Labor, and Facility Costs	$1,016	$1.58	$1.02

1 Totals were taken from the 1999 Ohio Dairy Enterprise Budgets (Table 1), raising heifers from 3 to 23 months.

2 Per day charges were calculated assuming that 640 days or 21 months are needed to raise the heifer.

3 Per day charges were calculated on 1,000 pounds of gain.

4 The total includes utilities, bedding, miscellaneous, and supplies.

Yearly Returns and Costs from Heifer Contracting

Entering a heifer raising arrangement will change income and expenses for both the dairy producer and heifer grower. Worksheet 1 (Table 4) estimates yearly changes in income and expenses for arrangements that pay the grower based on a per day charge.

The worksheet has two parts:

1. Inputs-items that are used to estimate yearly charges and costs, and
2. Per year charges and costs-estimates of various charges and expense categories.

Use of the worksheet is illustrated with the following example (refer to Table 4):

A producer with 200 cows is contemplating entering a heifer-raising arrangement with a grower who will only raise heifers for the producer. On average, the 200 cow herd has 200 heifers requiring raising. The producer will transport the heifers to the grower at 3 months of age and the heifers will return to the producer at 23 months of age. Given 200 replacements, about 175 heifers will be at the grower at a time, as indicated on line 1 of the worksheet. The 175 number results from multiplying 200 (heifers owned by the producer) by 21 (the average months that a heifer is with the grower), and dividing by 24 (the average number of months required to raise a heifer).

The dairy producer pays the grower $1.50 per day that a heifer is with the grower (line 2). The grower incurs an average of $1.00 per day in feed costs (line 3) and $0.14 per day in other variable costs (line 4). The grower estimates that 4 hours will be spent per day caring for the 175 heifers (line 5) and the grower places a $10.00 per hour value on labor (line 6). The grower has existing facilities and has no intention of replacing those facilities. The grower estimates that repairs and property taxes on the building will total $5,000 per year (line 7).

It is assumed that the impacts would be the same for the producer and the grower, regardless of which one raised the heifers. For example, the grower spends the same amount of time with the heifers as did the producer, the grower has the same feed costs as the producer, and the grower has the same facility costs as did the producer. However, impacts do not have to be the same. If the grower has different costs than does the producer, two worksheets will need to be completed-one for the producer and one for the grower.

Given the above situation, the dairy producer will pay the grower $95,813 per year (line A of Worksheet 1). This $95,813 will be a variable cost to the producer and a revenue to the grower. Feed costs will total $63,875 per year (line B) and other variable costs will total $8,943 per year (line C). The dairy producer's feed and other variable costs will be reduced by these amounts; the feed and other variable costs will be expenses to the grower. Given these items, the charge less variable costs equals $22,995 (line D). For the dairy producer, variable costs will increase by $22,995 by entering the heifer contracting arrangement. These costs may be offset by the opportunity to add more cows to the herd

or by reducing fixed costs. The grower will have $22,995 of revenue above variable costs by entering the arrangement.

Labor costs equal $14,600 (line E). The dairy producer will have $14,600 of freed-up labor and may be able to reduce labor costs by eliminating labor or reorient labor for other uses. The grower will incur additional labor costs.

Based on these items, the charge less variable and labor costs equals $8,395 (line F) and the charge less variable, labor, and facility costs is $3,395 (line G).

Table 4. Worksheet 1: Yearly returns and costs from a heifer-raising arrangement for heifer charges on a per day basis

	Example	Your Numbers
INPUTS		
1. Average number of heifersa	$175	
2. Per day heifer-raising charge	$2	
3. Feed costs per day per heifer	$1	
4. Other variable costs per day per heifer	$0	
5. Average labor hours per day	$4	
6. Labor rate per hour	$10	
7. Facility costsb	$5,000	
PER YEAR CHARGES AND COSTS		
A. Heifer-raising charge	$95,813	
(line 1 x line 2 x 365)		
B. Feed costs	$63,875	
(line 1 x line 3 x 365)		
C. Other variable costs	$8, 943	
(line 1 x line 4 x 365)		
D. Charge less variable costs	$22, 995	
(line A – line B – line C)		
E. Labor costs per year	$14,600	
(line 5 x line 6 x 365)		
F. Charge less variable and labor costs	$8,395	
(line D – line E)		
G. Charge less variable, labor, and facility costs	$3,395.00	
(line F – line 7)		

a. The average number of heifers that are at the grower's facility.

b. For new facilities, include depreciation, interest, insurance, taxes, and repairs. For facilities that will not be replaced, include only cash costs.

Justifying the Return to the Grower

For this situation, the major question for the grower is: Is $3,395 adequate compensation for entering into the heifer raising arrangement? This is an individualistic question likely to be influenced by economic and noneconomic factors. One implication of entering this arrangement is that the grower will have responsibilities every day of the year.

Given the above situation, the net income of the grower may be higher than $3,395, depending on how labor is handled. If the grower provides all labor and does not hire any labor, the $14,600 labor cost will not be a cash cost. Instead, net income will be $17,995 ($95,813 charge less variable and facility costs).

Charge less variable, labor, and facility costs (line G) will depend on the per day heifer-raising charge. Given the situation presented above, each $0.05 increase in the per day charge results in $3,194 more return per year. The break-even point is $1.45 per day. At this per day charge, the charge less variable, labor, and facility costs equals zero.

The return will also depend on the number of heifers raised per year. Generally, the charge less variable, labor, and facility costs (Line G) will decrease as the number of heifers raised declines. For example, the charge less variable, labor, and facility costs would decline to $110 if the average number of heifers was reduced to 150 rather than 175.

Justifying the Cost to the Dairy Producer

The dairy producer will incur additional costs by entering the heifer-raising agreement. Additional costs can range from a high of $22,995 (charge less variable costs as shown in line D) down to a low of $3,395 (charge less variable, labor, and facility costs shown in line G). Additional costs will be closer to $22,995 if the producer does not use heifer contracting to reduce labor or fixed costs. This situation might occur if the producer is using labor and facilities for other aspects of the dairy operation. Additional costs will be closer to $3,395 if the producer lowers labor costs and gets rid of facilities as a result of entering the contractual arrangement. Another situation in which costs will be closer to $3,395 is if the dairy producer has expanded and is using contracting as a way of foregoing investment in heifer-raising facilities.

There are several means of justifying costs close to $22,995. One means is to increase milk production. Specialization of labor and management responsibilities because heifers no longer have to be raised may result in a more efficient milking herd. Given that revenue from milk less variable costs is $4.35 per cwt. of milk produced, a typical return for a 21,000 lb producing herd, an increase in milk production of 2,643 pounds per cow would justify the additional expense. Another means is to expand herd size. Space taken

up by heifers may become available for milking cows in some cases. If revenue from milk less variable cost equals $914 per cow, a typical return for a 21,000 lb producing herd, an additional 20 cows would justify the heifer contracting expense.

In the case of an expansion, costs will likely be closer to $3,395. In an expansion situation, heifer contracting may conserve debt capital. For example, new heifer facilities for a 200 cow herd will cost around $60,000. Contracting heifers will eliminate the need to make investments in these heifer facilities. The interest on these facilities can justify the additional cost of heifer contracting. For example, interest on a $60,000 investment will be greater than the $3,395 additional cost of heifer contracting.

Summary

Charges for heifer contracting using a per day arrangement have to be around $1.50 per heifer per day to cover the grower's costs. Heifer contracting will change the composition of a dairy producer's costs. Higher costs for heifer raising can be justified by increasing the efficiency of the herd, adding additional cows, or reducing investment.

Appendix: 1999 Dairy Heifer Production Budget - Large Breed Birth to Freshening (24 Months)

			Breakdown by Month					
Item	**Quantity**	**Price**	**1 to 2**	**23 to 12**	**13 to 23**	**24**	**Total**	**Your Budget**
RECEIPTS								
Bred heifer	1	$1,200					$1,200	
VARIABLE COSTS								
Feed1								
Hay equivalent	3.45 ton	110/ton	23	140	197	19	380	
Corn silage	6.0 ton	26.28/ton	0	63	87	8	158	
Corn	41 bu	2.20/bu	2	43	60	6	110	
Soybean meal 48%	444 lb	0.10/lb	3	17	22	2	44	
Salt TM	50 lb	0.12/lb	0	2	2	1	6	
Dical phosphate	50 lb	0.25/lb	0	5	5	1	10	
Milk replacer	40 lb	0.85/lb	34	0	0	0	34	
TOTAL FEED COSTS			62	271	373	36	742	
OTHER VARIABLE COSTS								
Veterinary and medicine			8	4	9	1	22	

Breeding and registration			0	0	25	0	25	
Utilities			2	6	7	1	15	
Bedding	1 ton	60/ton	6	24	24	6	60	
Miscellaneous and supplies			2	7	8	1	17	
Interest on operating capital2		9.00%	13	35	20	0	67	
TOTAL OTHER VARIABLE COSTS			30	76	92	9	207	
TOTAL VARIABLE COSTS			92	347	465	45	949	
FIXED COSTS								
Heifer calf3	1 head	135/head	149	0	0	0	149	
Labor charge	25 hours	10.00/hour	50	80	95	25	250	
Interest and insurance on heifer4			2	13	16	2	33	
Equipment charge5		100	3	15	16	1	35	
Building charge6		300	7	37	41	4	88	
Management charge7			5	25	28	2	60	
TOTAL FIXED COSTS			216	170	196	34	615	
TOTAL COSTS			307	517	661	79	1564	
RETURN ABOVE VARIABLE COSTS							251	
RETURN ABOVE TOTAL COSTS							-364	
PER DAY COSTS8			**Costs Per Day**					
Feed costs			$1.02	$0.89	$1.11	$1.19	$1.01	
Variable costs			$1.51	$1.14	$1.39	$1.49	$1.30	
Fixed costs			$1.10	$0.56	$0.58	$1.11	$0.64	
Total costs			$2.61	$1.69	$1.97	$2.60	$1.93	

1. Corn silage priced at cost of production ($21.28/ton) + $5 handling charge. Corn priced at cost of production. Costs of production can be found in the Ohio Crop Enterprise Budgets.

2. Interest on operating capital is based on a 9 percent interest rate. Interest costs for each period are calculated on all variable costs during that period. For the 1- to 2-month

breakdown, interest costs are calculated for 23 months. The 23 months represents the average time that costs incurred during the 1- to 2-month period must be held before the heifer freshens. For the 1- to 2-month period, interest costs equal $13 ($80 of variable costs during the period x 0.09 interest rate/12 months x 23 months). Interest costs are calculated for 23, 16, 6, and 1 months for the 1 to 2, 3 to 12, 13 to 23, and 24 month breakdowns, respectively.

3. Based on a 10% death loss on heifers, therefore purchases of 1.1 heifers account for this death loss.

4. Interest is based on a 9 percent interest rate and the purchase price of the heifer. For the 1- to 2-month period, interest costs equal $149 x 0.09 interest rate/12 months x 2 months. Interest costs for the remaining periods are based on the purchase price price plus interest and insurance costs of previous periods. The rate for insurance costs is 0.43 percent per dollar of value. Values per period are $135, $400, $800, and $1,200 for the 1 to 2, 3 to 12, 13 to 23, and 24 month periods, respectively.

5. Equipment charge equals 17.6% of new equipment costs for a two-year period. New equipment costs equal $100 per heifer. Equipment charge = 0.176 x $100 x 2.

6. Building charge equals 14.7% of new building costs for a two-year period. New building costs equal $300 per heifer. Building charge = 0.147 x $300 x 2.

7. Management charge is 5 percent of receipts.

8. Per day costs do not include the cost of the heifer calf.
