



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



THE ECONOMICS OF HEIFER CONTRACTING

ESO 2305

Gary Schnitkey and Joe Beiler
State Specialist and County Agent
Department of Agricultural Economics
The Ohio State University
(614) 292-6409
April 1996

Waite Library
Dept. of Applied Economics
University of Minnesota
1994 Buford Ave - 232 ClaOff
St. Paul MN 55108-6040 USA

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 publication covers issues related to these questions by addressing three topics. First, we list typical costs for growing a heifer. Then, per day charges that cover a grower's costs are given. This material aids in determining a charge that provides a grower a reasonable return. Finally, we discuss how revenues and costs will change when entering a heifer raising contract. Ways of justifying the returns and costs also are discussed.

This publication 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 \$1.25 and \$1.60 per day. A grower generally provides and pays for all feed, labor, facilities, and routine health care. The producer generally pays for artificial insemination and specifically requested health items. We emphasize this form 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" for a discussion of other forms.)

Costs of Raising Dairy Heifers

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 this Table are for a Holstein heifer and come from the 1996 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 \$633 of feed costs accounts for 67 percent of the total costs of growing a heifer. Given the high percentage, properly feeding heifers has a large impact on the grower's profitability.

The \$633 of total feed costs equals an average \$.99 per day feed costs. 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 a \$2.80 per bushel corn price and a \$100 per ton hay price. A \$.50 increase in the corn price causes feed costs to increase by \$.06 per day (see Table 2). A \$20 per ton increase in hay price causes feed costs to increase by \$.10 per day (see Table 2).

**Table 1. Heifer Raising Costs Incurred by the Grower,
3 to 24 Months, Ohio, 1996 1/.**

Item	----- Costs Breakdown by Period 2/ -----		
	3 to 12	13 to 23	3 to 23
Feed Costs			
Corn	\$45	\$62	\$107
SBOM	24	31	55
Dical phosphate	6	6	12
Salt	2	2	4
Hay	128	179	307
Corn silage	62	86	148
Total Feed Costs	\$267	\$366	\$633
Other Variable Costs			
Veterinary and medicine	\$4	\$9	\$13
Utilities	6	7	13
Bedding	22	22	44
Misc. and supplies	7	8	15
Total Other Variable Costs	\$39	\$46	\$85
Labor Costs	\$56	\$67	\$123
Facility Costs			
Equipment charge	\$15	\$16	\$31
Building charge	37	41	78
Total Fixed Costs	\$52	\$57	\$109
Total Costs	\$414	\$536	\$950
Per Day Costs			
Feed costs	\$0.88	\$1.09	\$0.99
Other variable costs	0.13	0.14	0.13
Labor costs	0.18	0.20	0.19
Facility costs	0.17	0.17	0.17
Total per day costs	\$1.36	\$1.60	\$1.48

1/ Costs are taken from 1996 Ohio Dairy Enterprise Budgets given in the Appendix. Only costs incurred by the heifer grower are included in this table.

2/ The '3 to 12' column gives costs of raising a heifer from 3 months of age to 12 months of age '13 to 23' lists costs for 13 to 23 months.

378.771
D344
2305

Table 2. Per Day Feed Costs Given Differing Corn and Hay Prices, Heifers from 3 to 24 Months 1/.

Hay Price (\$ per ton)	----- Corn Price (\$ per bushel) -----			
	\$2.00	\$2.50	\$3.00	\$3.50
\$ 60	.70	.76	.82	.88
\$ 80	.79	.85	.92	.98
\$100	.89	.95	1.01	1.08
\$120	.98	1.05	1.11	1.17

1/ Calculated using feed requirement in Ohio Dairy Enterprise Budgets.
See Table 1.

Growers do not have much control over feed prices. Given that feed prices vary, per day charges also may have to vary. Otherwise, the grower may lose money during high feed price periods.

Labor costs in Table 1 are based on 17.5 hours of labor priced at \$7.00 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, heifer growers raising smaller numbers of heifers likely will have to charge higher rates than growers with larger numbers.

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 raising facilities. Facility costs will be lower for growers who have existing facilities and have no intentions of replacing these facilities. In these cases, facility costs will consist only of repairs and taxes.

Table 1 breaks down costs into sub-periods. 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 \$.88 for the 3 to 13 month period and increase to \$1.09 for the 13 to 23 month period. After one month of age, feed costs generally increase with the age of the heifer. By the 24 month, per day feed cost equals \$1.16. 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.

Charges to Cover Costs

We use the costs in Table 1 to examine 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. We also include a "per pound charge" column. This column divides total costs by an assumed 1,000 pound 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 is \$1.12. If a per day arrangement is used, the dairy producer must pay the grower at least \$1.12 per day. If the grower does not receive at least \$1.12 per day, the grower does not cover variable costs. If variable costs are not covered, the grower never has an economic incentive to raise heifers.

Variable costs will change as feed prices change. For example, an increase in corn price from \$2.80 per bushel up to \$3.50 per bushel will increase the charge to cover variable costs to \$1.21. Two ways can be used to account for changes in feed prices. One way is to adjust charges received by the grower for changes in feed prices. Another way 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 risks of feed price changes.

Per day labor costs equal \$.19 per day (see Table 3). The \$.19 per day may or may not be a cash cost to the grower. If the grower

provides all the labor, the \$.19 represents a return to his labor. If the grower has employees, some or all of the \$.19 represents a cash cost to the grower.

Facility costs add \$.17 to the per day charge (see Table 3). As stated previously, the \$.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 percent of the facility costs. Therefore, facility costs may drop to \$.04 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 \$1.48 per day (see Table 3). The grower must receive at least this much compensation to cover costs. The break-even \$1.48 amount may vary depending on feed prices, labor requirements, and facilities. For example, the \$1.48 reduces to \$1.30 if corn prices fall from \$2.80 to \$2.50 and facility costs total \$.04 per day. Alternatively, the \$1.48 charge increases to \$1.55 if corn prices rise from \$2.80 to \$3.50 per bushel.

Yearly Returns and Costs From Heifer Contracting

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

**Table 3. Per Day and Per Pound Heifer Raising Charges to Cover Various Expenses.
Heifer Raised from 3 to 23 Months.**

Item	Total 1/	Per Day Charge 2/	Per Pound Charge 3/
Feed Costs	633	0.99	0.63
Other Variable costs 4/	85	0.13	0.09
Charge to Cover Variable Costs	\$718	\$1.12	\$0.72
Labor	123	0.19	0.12
Charge to Cover Variable and Labor Costs	\$841	\$1.31	\$0.84
Facility Costs	109	0.17	0.11
Charge to Cover Variable, Labor, and Facility Costs	\$950	\$1.48	\$0.95

1/ Totals are taken from the Ohio Dairy Enterprise Budgets (Table 1), raising heifers from 3 to 24 months

2/ Per day charges are calculated assuming that 671 days or 22 months are needed to raise the heifer.

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

4/ The total includes utilities, bedding, misc. and supplies.

The Worksheet has two parts:

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

We illustrate the use of the Worksheet with the following example.

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 the heifers 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 multiply 200, the heifers of the producer, by 21, the average months that a heifer will be at the grower, and dividing by 24, the average months required to raise a heifer.

The dairy producer pays the grower \$1.45 per day that a heifer is with the grower (line 2). The grower incurs an average of \$.99 per day in feed costs (line 3) and \$.13 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 \$7.00 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 building will total \$5,000 per year (line 7).

In our discussion, we assume that impacts are the same on the producer and the grower. 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. Impacts do not have to be the same. If the grower has different costs than does the producer, two Worksheets need to be completed: one for the producer and one for the grower.

Given the above situation, the dairy producer will pay the grower \$92,619 per year (line A of Worksheet 1). This \$92,619 will be a variable cost to the producer and a revenue to the grower. Feed costs will total \$63,236 per year (line B) and other variable cost will total \$8,304 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 \$21,079 (line D). For the dairy producer, variable costs will increase by \$21,079 by entering the heifer contracting arrangement. The grower will have \$21,079 of revenue less variable costs by entering the arrangement.

Labor costs equal \$10,220 (line E). The dairy producer will have \$10,220 of freed up labor. The dairy producer may reduce labor costs by eliminating labor. Or labor could be re-oriented for other uses. The grower has additional labor costs.

Based on the items, the charge less variable and labor costs equals \$10,859 (line F) and the charge less variable, labor, and facility costs is \$5,859 (line G)

**Worksheet 1. Yearly Returns and Costs From a Heifer Raising Arrangement,
Heifer Charges on a Per Day Basis.**

	Example	Your Numbers
INPUTS		
1. Average number of heifers a/	175	_____
2. Per day heifer raising charge	\$1.45	_____
3. Feed costs per day per heifer	\$0.99	_____
4. Other variable costs per day per heifere	\$0.13	_____
5. Average labor hours per day	4	_____
6. Labor rate per hour	\$7.00	_____
7. Facility costs b/	\$5,000	_____
PER YEAR CHARGES AND COSTS		
A. Heifer raising charge (line 1 x line 2 x 365)	\$92,619	_____
B. Feed costs (line 1 x line 3 x 365)	\$63,236	_____
C. Other variable costs (line 1 x line 4 x 365)	\$8,304	_____
D. Charge less variable costs (line A - line B - line C)	\$21,079	_____
E. Labor costs per year (line 5 x line 6 x 365)	\$10,220	_____
F. Charge less variable and labor costs (line D - line E)	\$10,859	_____
G. Charge less variable, labor, and facility costs (line F - line 7)	\$5,859	_____

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

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

Justifying the Return to the Grower

For this situation, the major question before the grower is: Is \$5,859 adequate compensation for entering into the heifer raising arrangement? This is an individual question likely to be influenced by economic and non-economic 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 \$5,859, depending on how labor is handled. If the grower provides all labor and does not hire any labor, the \$10,220 of labor costs will not be a cash cost. Instead, net income will be \$16,079 (\$5,859 charge less variable, labor, and facility costs + \$10,220 of labor).

Charge less variable, labor, and facility costs (line F) will depend on the per day heifer raising charge. Given the situation presented above, each \$.05 increase in the per day charge results in \$3,193 more return per year. The break-even point is \$1.36 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 will decrease as the number of heifers raised declines. For example, in the charge less variable, labor, and facility costs decline to \$2,848 when the average number of heifers is 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 \$21,079 (charge less variable costs as shown in line D) down to a low of \$5,859 (charge less variable, labor, and facility costs shown in line G). Additional costs will be closer to \$21,079 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 freed-up facilities for other aspects of the dairy operation. Additional costs will be closer to \$5,859 if the producer lowers labor costs and gets rid of facilities as a result of entering the contractual arrangement. Costs will be closer to \$5,859 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 \$21,079. 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 milk herd. Given that revenue less variable costs are \$6.00 per cwt. of milk produced, a typical return for a 21,000 pound producing herd, an increase in milk production of 1,756 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 less variable cost equal \$1,200 per cow, a typical return for a 21,000 pound producing herd, an additional 17 cows would justify the heifer contracting expense.

In the case of an expansion, costs will likely be closer to the \$5,859. 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 costs of heifer contracting. For example, interest on a \$60,000 investment will be close to the \$5,859 additional costs of heifer contracting.

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.

Summary

Charges for heifer contracting have to be around \$1.40 per day to cover the grower's

1996 DAIRY HEIFER PRODUCTION BUDGET -- LARGE BREED
BIRTH TO FRESHENING (24 Months)

ITEM	QUANTITY	PRICE	----- Breakdown by Month -----				TOTAL	YOUR BUDGET
			1 to 2	3 to 12	13 to 23	24		
RECEIPTS								
Bred Heifer	1	\$1,200					\$1,200	\$
VARIABLE COSTS								
Feed								
Corn (bu.)	41	\$2.80	\$2	\$45	\$62	\$6	\$115	\$
SBOM (lb.)	444	\$0.14	4	24	31	3	62	
Dical Phosphate (lb.)	50	\$0.26	1	6	6	1	13	
Salt (lb.)	50	\$0.09	0	2	2	1	5	
Hay Equiv. (ton)	3.45	\$100.00	21	128	179	17	345	
Corn Silage (ton) 1/	6	\$26.00	0	62	86	8	156	
Milk Replacer (lb.)	40	\$0.75	30	0	0	0	30	
TOTAL FEED COSTS			\$57	\$267	\$366	\$35	\$725	\$
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 (ton)	1	\$55.00	6	22	22	6	55	
Misc. and Supplies			2	7	8	1	17	
Interest on Operating Capital 2/			14	38	22	0	74	
TOTAL OTHER VARIABLE COSTS			\$30	\$77	\$92	\$9	\$208	\$
TOTAL VARIABLE COSTS			\$87	\$344	\$458	\$44	\$933	\$
FIXED COSTS								
Heifer Calf 3/	1.1	\$135.00	\$149	\$0	\$0	\$0	\$149	\$
Labor Charge (hrs.)	25	\$7.00	35	56	67	18	175	
Interest & Insurance on Heifer 4/			3	14	17	2	35	
Equipment Charge 5/			3	15	16	1	35	
Building Charge 6/			7	37	41	4	88	
Management Charge 7/			5	25	28	2	60	
TOTAL FIXED COSTS			\$201	\$147	\$168	\$26	\$542	\$
TOTAL COSTS			\$288	\$491	\$626	\$70	\$1,475	\$
RETURN ABOVE VARIABLE COSTS							\$267	\$
RETURN ABOVE TOTAL COSTS							(\$275)	\$
PER DAY COSTS 8/								
			----- Costs Per Day -----					
FEED COSTS			\$0.94	\$0.87	\$1.09	\$1.16	\$0.99	\$
VARIABLE COSTS			\$1.43	\$1.13	\$1.37	\$1.44	\$1.28	\$
FIXED COSTS			\$0.86	\$0.48	\$0.50	\$0.87	\$0.54	\$
TOTAL COSTS			\$2.29	\$1.61	\$1.86	\$2.31	\$1.81	\$

- 1/ Per ton corn silage price equals corn price x 7.5 + \$5 for filling.
- 2/ Interest on operating capital is based on a 10 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 must be held before the heifer is grown. For the 1 to 2 month period, interest costs equal $\$1 = \$75 \text{ of variable costs during the period} \times .10 \text{ interest rate} / 12 \text{ months} \times 23 \text{ months}$. 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/ There is a 10% death loss on heifers. Purchases of 1.1 account for death loss.
- 4/ Interest is based on a 10 percent interest rate and the purchase price of the heifer. For the 1-2 month period, interest costs equal $\$149 \times .1 \text{ interest rate} / 12 \text{ months} \times 2 \text{ months}$. Interest costs for the remaining periods are based on the purchase price plus interest and insurance costs of previous periods. The rate for insurance costs is .43 percent per dollar of value. Values per period are \$135, \$400, \$800, and \$1,000 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 = $.176 \times \$100 \times 2$.
- 6/ Building charge equals 14.7 percent of new building costs for a two-year period. New building costs equal \$300 per heifer. Building charge = $.147 \times \$300 \times 2$.
- 7/ Management charge is 5 percent of receipts.
- 8/ Per day costs do not include the cost of the heifer calf.