Alberta Dairy Management
PREPARED FOR AND DISTRIBUTED BY THE DAIRY EXTENSION ADVISORY GROUP

The Cost of Raising Replacements

It probably costs you $1000 to $1500 to raise a single replacement heifer to first calving. Typical cost breakdowns for 24 and 30 month calving are shown in figure 1. Of course, the total annual cost of raising heifers on your farm depends on the total number of calves required to replace culled cows. The number of calves that must enter the replacement herd each year depends on :

- cow culling rate;
- calf and heifer mortality, and;
- rate of heifer culling before calving.

Here's how each of these factors affects the number of heifer calves required and the total cost of raising them to calving.

Cow culling rate

Let's assume you milk a herd of 100 cows. If 30 of those cows are culled, sold to another dairyman or die each year, then your annual culling rate is 30%. You will require 30 heifers each year for replacement. Using a total cost to calving at 24 months of $1,202 (figure 1), you will have invested $36,060 in those 30 heifers by the time they calve.

Calf and heifer mortality

As many as 15-20% of calves die between birth and six weeks of age, but usually no more than 5% after six weeks. Assuming that a total of 20% die before they calve, you have to start 38 calves to have 30 available as herd replacements.

The contribution of mortality to total replacement costs depends on the amount that has been invested before the loss occurs. Table 1 shows how costs accumulate for heifers that calve at 24 months of age. If the average loss occurs at 2 months of age, only 8% of the total cost of rearing has been incurred. For the example shown in figure 1, 20% mortality would add about $24 to the cost of raising a heifer to 24 month calving.

Heifer culling rate

In most herds, about 5-10% of heifers are culled because of poor conformation or failure to breed. Adding 10% culling to 20% mortality, 42 calves have to be started if 30 heifers are to enter the milking herd.

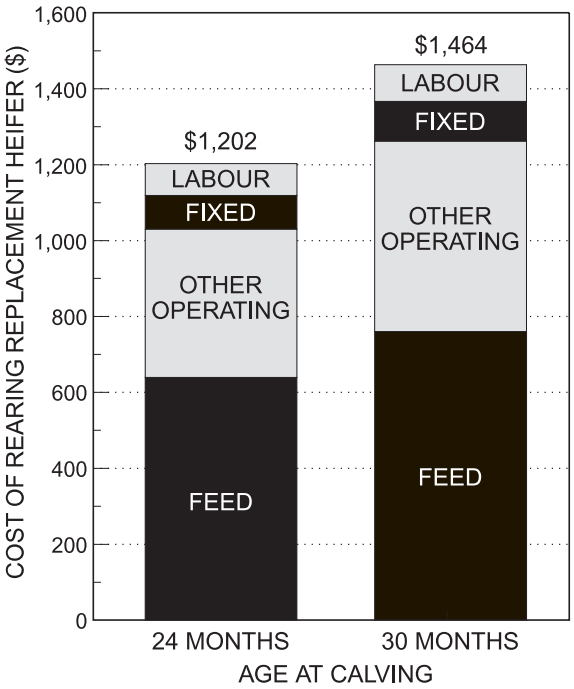

Figure 1 : Breakdown of costs incurred in raising heifers to calve at 24 or 36 months. (Manitoba Agriculture, 1986)

Assuming that culled heifers are sold for beef at an average age of 16 months weighing 900 pounds, they should return enough to cover rearing costs. For example, at a beef price of $75/cwt, the return would be $675. The costs incurred by this age (table 1) are about 56% of the total which amounts to $673 for the heifer calving at 24 months (figure 1).

AGE months	WEIGHT pounds	ACCUMULATED COSTS % of total
0	100	0
2	200	8
4	300	13
8	500	25
12	700	40
16	900	56
20	1100	76
24	1300	100

Table 1 : Accumulation of rearing costs as heifers grow to calving at 24 months.

Heifer calves required

The worksheet below will help you determine the number of heifer calves that must enter your replacement herd annually. The three examples shown in the worksheet demonstrate the effects that cow culling, calf and heifer mortality and heifer culling rates have on the number of calves required.

Assuming a 13 month calving interval, 100 cows will produce 92 calves per year - about 46 will be heifers. In example 3, 52 heifer calves are required to satisfy the herd's replacement needs, more than can be provided by the herd itself.

Age at first calving

The age of your heifers at calving has no effect on the number of calves required annually. However, calving age does affect the size of the replacement herd.

Let's assume you milk 100 cows, your cow culling rate is 30%, your calf and heifer mortality rate is 20% and you cull 10% of your heifers before calving. Example 1 demonstrates that you must start 42 calves annually to end up with 30 heifers entering the milking herd each year. With an average age at first calving of 24 months, over that 2 year period 84 calves will enter the replacement herd and 60 heifers will leave to enter the milking herd. Therefore, the 'average' size of the replacement herd will be 72 animals (the average of 84 and 60).

COW CULLING %	AGE AT FIRST CALVING (months) 24	27	30
	ANNUAL REPLACEMENT COST ($)		
25	30,651	33,992	37,332
30	36,781	40,790	44,798
35	42,911	47,588	52,265

Table 2 : The effects of cow culling rate and age at first calving on total annual replacement cost for a herd of 100 cows assuming : rearing costs from figure 1; 20% replacement mortality, culled heifers sold for beef at breakeven price.

At the same culling and mortality rates but an average age at first calving of 30 months (example 2), the average size of your replacement herd has to be 90 animals to have 30 of them calving annually.

As age at first calving increases, both fixed and variable costs increase, as shown in figure 1. The increase in fixed costs is due to the requirement for more facilities to house the larger replacement herd. With a rearing cost of $1,464 to calving at 30 months (figure 1), the annual cost to raise 30 heifers is $43,920. The figures given in table 2 combine the effects of cow culling rate, age at first calving and replacement mortality on total replacement costs.

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REPLACEMENT HERD WORKSHEET

		EXAMPLES 1	2	3	YOUR FIGURES
A	NUMBER OF COWS MILKING	100	100	100	.....
B	% OF COWS DIED, SOLD OR CULLED EACH YEAR	30	30	35	.....
C	NUMBER OF REPLACEMENTS REQUIRED EACH YEAR **A** x **B**/100	30	30	35	.....
D	% OF CALVES AND HEIFERS THAT DIE BEFORE CALVING	20	20	25	.....
E	% OF HEIFERS THAT ARE CULLED BEFORE CALVING	10	10	10	.....
F	NUMBER OF HEIFER CALVES REQUIRED EACH YEAR **C** x [100 / (100-**D**)] x [100 / (100-**E**)]	42	42	52	.....
G	AVERAGE AGE AT FIRST CALVING (months)	24	30	30	.....
H	AVERAGE SIZE OF REPLACEMENT HERD (**C** + **F**) / 2 * (**G** / 12)	72	90	109	.....