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Cost of Raising Replacement Heifers

Key Takeaways

Raising replacement heifers is a significant and long-term investment for cow-calf producers, with major implications for profitability. Each heifer retained for breeding represents one less calf sold in the fall—a considerable opportunity cost, especially when calf prices are at record highs. Producers need to weigh the long-term economic impact of raising heifers and stay mindful of market volatility throughout the heifer's lifespan.

Based on data from 63 benchmark farms in the COP Network, we estimated the cost of raising replacement heifers in 2023 at an average of \$2,904/heifer, ranging from \$1,905 to \$3,806. Notably, the forgone revenue from not selling the calf at weaning accounts for 60% of the total costs, with other major expenses tied to labour and essential inputs linked to feed production and land.

The payback period for recovering the initial investment on replacement heifers varies greatly depending on efficiency. Assuming calf prices increase 25% from the 2015-2023 average in the next ten years, low-cost farms can recoup their investment in about 5 years for heifers retained in 2023, while medium-cost farms take 7 years. However, high-cost farms are unlikely to recover their initial investment within the heifer's productive lifespan.

From a whole-herd perspective, total replacement cost depends on both the cost of raising each replacement heifer and the overall replacement rate. For the 63 benchmark farms, replacement cost accounts for an average of 8% of total herd costs in 2023. When the cost of all replacement heifers is distributed across the entire cow herd, the average replacement cost per cow is estimated at \$139, with a range from \$50 to \$272/cow. While higher replacement rates typically lead to higher costs, focusing only on reducing open rates or cow death losses may not always pay off. Farms with higher replacement rates can still lower costs through efficient management. Effective cost control is crucial to optimizing herd replacement strategies.

What we did

This study analyses the costs, including cash, depreciation and opportunity costs, associated with raising replacement heifers from weaning until pregnancy check in the fall of the following year, covering approximately 12 months with one winter-feeding and one summer-grazing period.

The analysis uses data from 63 benchmark farms from the Canadian Cow-calf Cost of Production Network (COP Network). Two benchmarks (QC-3, QC-5) that purchase 100% of replacement heifers are excluded in this study.

The costs associated with raising replacement heifers include:

- **Opportunity Costs:** The potential revenue forgone by not selling the heifer calf at weaning.
- **Feed Costs¹:** This includes both purchased feed and the input costs (fertilizer, seed, pesticides) for homegrown feed.
- **Land Costs²:** Both cash costs for rented land and opportunity costs for owned land are included.
- **Animal Purchases³:** Primarily the cost of purchasing bulls.
- **Overhead and Other Costs⁴:**
 - Machinery (maintenance, depreciation, contractor services)
 - Fuel, energy, lubricants, water
 - Building costs (maintenance, depreciation)
 - Veterinary and medicine expenses
 - Insurance and taxes
 - Other inputs related to cow-calf operations
- **Labour Costs:** Includes both paid and unpaid labour.
- **Capital Costs:** Includes both liabilities (cash) and opportunity costs on capital.

What we learned

Average Cost of Raising Replacement Heifers in 2023

The average total cost of raising a replacement heifer retained in 2023 is estimated at \$2,904/heifer, including cash costs, depreciation, and opportunity costs

The average total cost of raising a replacement heifer retained in 2023 is estimated at \$2,904/heifer, with a range from \$1,905 to \$3,806. Lower costs observed in two benchmarks (MT-3 and MT-5) with costs below \$2,000/heifers are attributed to low opportunity costs, driven by weak heifer calf prices in the region during the weaning period.

¹ Feed costs are allocated to replacement heifers based on their weight proportion relative to the entire herd, with their weight assumed to be 65% of a mature cow's weight.

² Land costs are also allocated based on the weight proportion of replacement heifers in the herd.

³ Animal purchase costs are allocated based on the percentage of replacement heifers number relative to total breeding female number.

⁴ Overhead and other costs, labour, capital costs are allocated based on the percentage of replacement heifers relative to total cattle number.

The total costs include cash costs, depreciation, and opportunity costs (e.g., land, labour, capital and foregone revenue from not selling the calf). When opportunity costs for land, labour, and capital are excluded, the average cost is estimated at \$2,570/heifer, with a range of \$1,611 to \$3,389.

The analysis for the rest of this factsheet is based on total costs including opportunity cost on land labour and capital.

Cost Structure

The largest portion is attributed to opportunity costs of not selling calves at weaning.

Looking at the detailed breakdown of the cost components associated with raising replacement heifers, the largest portion, 60%, is attributed to opportunity costs of not selling calves at weaning. Other major costs are tied to labour and essential inputs linked to feed production and land.

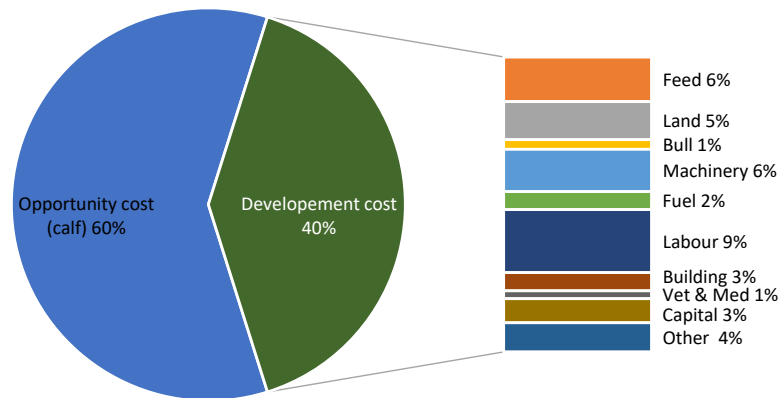


Figure 1. Cost Structure of Raising Replacement Heifers (detailed breakdown)

Looking at total cost from another perspective, 23% of the development cost is cash cost, 6% is depreciation on machinery and building, and 11% is opportunity cost on unpaid labour, owned land and capital.

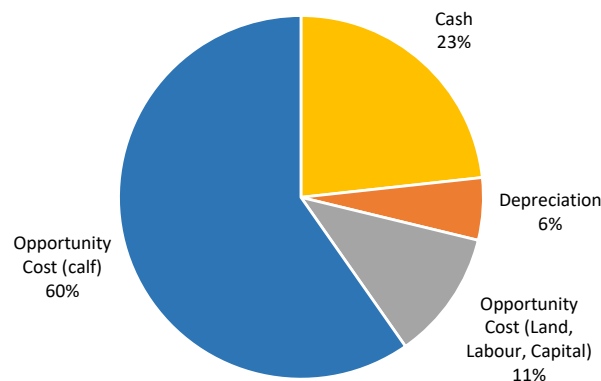


Figure 2. Cost Structure of Raising Replacement Heifers (cash, depreciation, opportunity costs)

Five-year Trend (2019-23)

Costs of raising replacement heifers were relatively stable from 2019 to 2021 before the hike in 2022 and 2023, driven by sharply higher calf prices and elevated input costs.

From 2019 to 2023, the average cost of raising a replacement heifer across the 63 benchmark farms increased 49% from \$1,947/heifer in 2019 to \$2,904 in 2023 (Figure 3). Costs were relatively stable from 2019 to 2021 before surging 13% in 2022 and another 25% in 2023, driven by sharply higher calf prices and elevated input costs.

The estimated cost of raising replacement heifers has been higher than the market price of Alberta bred heifers, with differences ranging from 2-7%, except in 2022 where the gap reached 21% (Table 1). The higher cost estimates from the COP Network may be attributed to factors like the inclusion of opportunity costs for land, labor, and capital, as well as benchmarks that represent higher-cost producers across different regions.

The significant 21% difference in 2022 is likely due to a soft market for bred heifers following the 2021 drought as producers faced limited feed and pasture availability. At the same time, the cost of raising replacement heifers surged, driven by sharply higher opportunity costs due to strong calf prices. However, for farms with sufficient feed and resources, 2022 presented an opportunity to purchase bred heifers at a lower cost compared to raising their own, purely from a cost standpoint. That said, purchasing replacement heifers carries production risks. Introducing new animals into a herd can pose biosecurity risks and the potential for disease, depending on the source of the animals. Moreover, it can be challenging to predict how purchased heifers will perform in a new environment or adapt to different management practices.

Table 1. COP Network average cost of raising replacement heifers vs. Alberta average bred heifer prices, 2019-2023

	2019	2020	2021	2022	2023
COP Avg Cost (\$/heifer)	\$ 1,947	\$ 1,963	\$ 2,052	\$ 2,319	\$ 2,904
AB bred heifer price (\$/heifer)	\$ 1,895	\$ 1,916	\$ 1,917	\$ 1,916	\$ 2,735
Difference (%)	3%	2%	7%	21%	6%
Difference (\$/heifer)	\$52	\$47	\$135	\$403	\$169

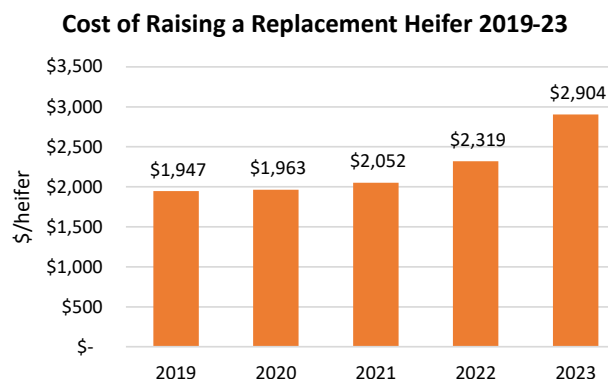


Figure 3. Cost of Raising a Replacement Heifer 2019-23

Payback Period

Producers with different cost levels for replacement heifers could face very different financial outcomes.

The payback period estimates the number of years that are required for the replacement heifers to pay for themselves. It is driven by the net cash flows the replacement heifers can generate over their lifetime which is influenced by the future prices of calves, annual cow maintenance costs, and the eventual salvage value of the cull cows.

To estimate the payback period for the benchmark farms, the data is categorized into three groups based on the total cost of raising a replacement heifer: Low, Medium, and High heifer cost groups, with 21 benchmarks in each group. The Low group's heifer costs averaged \$2,382/heifer, the Medium group \$2,907/heifer, and the High group \$3,422/heifer (Figure 4). Correspondingly, the annual cow costs (cash and depreciation) based on the 2019-2023 average are \$866 for the Low group, \$1,028 for the Medium group, and \$1,358 for the High group.

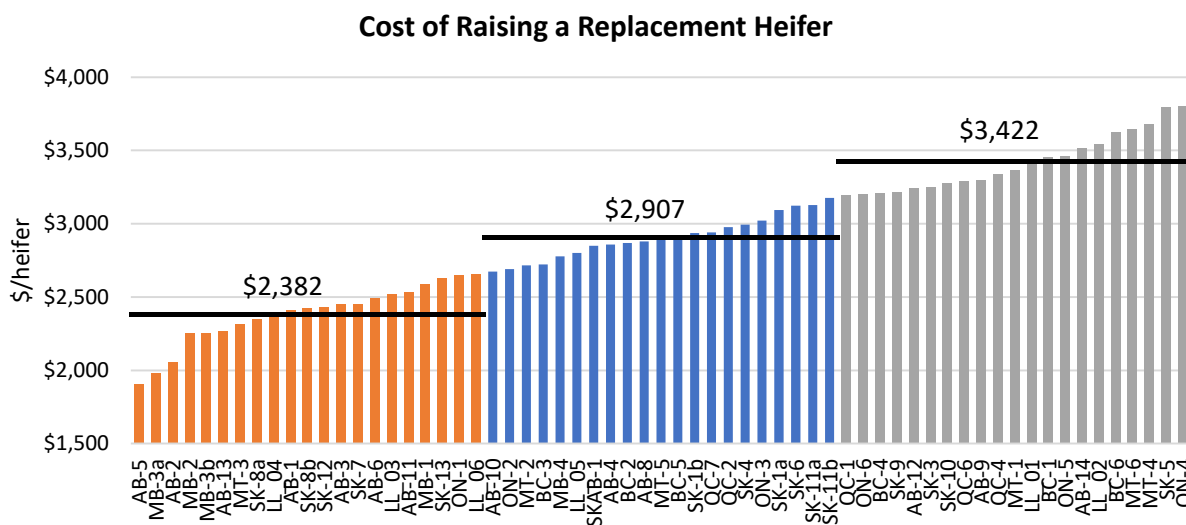


Figure 4. Cost of Raising a Replacement Heifer by Low, Medium and High heifer cost groups

Iowa University's Calculator: [Net Present Value of Beef Replacement Females](#) was used to estimate the payback period for these groups, assuming an average price of \$2.95/lb for 550 lb calves (a 25% increase from the 2015-2023 Alberta steer and heifer average of \$2.36/lb).

The results show that the Low heifer cost group would require 5 consecutive productive years to recover the initial cost of heifers retained in 2023, the Medium group would require 7 years; while the High group is unlikely to pay off the initial investment during the heifer's life span (Table 2).

As the payback period varies significantly across these cost groups, farms with different cost levels and structures for replacement heifers could face very different financial outcomes. Those with higher development costs may struggle to achieve profitability, especially if market conditions or herd productivity fluctuate.

Table 2. Payback period for Low, Medium and High heifer cost groups

Groups by Cost of Replacement Heifers	Avg Cost (\$/heifer)	Annual Cow Cost (\$/cow)	Payback Period (# of years)
Low	\$2,382	\$866	5
Medium	\$2,907	\$1,028	7
High	\$3,422	\$1,358	>15

Replacement costs averaged \$139/cow with a wide range from \$50/cow to \$272/cow.

Whole-herd Perspective: Cow Herd Replacement Cost

While we have estimates of the cost of a single heifer, it is important to also consider the replacement rate when evaluating the entire herd. Even if two farms have the same cost per replacement heifer, the one with a higher replacement rate will face a higher total herd replacement cost.

From a whole-herd perspective, the cost of all replacement heifers needed to maintain a steady herd is estimated to account for 8% of total herd costs, ranging from 4% to 13% across the 63 benchmark farms.

To compare replacement costs across different herd sizes, the total cost of all replacement heifers is divided by the number of mature cows, estimating a replacement cost per cow. On average, this cost is estimated at \$139/cow, with a range from \$50/cow to \$272/cow for 2023.

When the farms are divided into three groups based on replacement cost per cow (Low, Medium and High replacement cost groups) with 21 benchmarks in each group, the Low group averages at \$91/cow, the Medium group at \$137/cow, and the High group at \$188/cow (Figure 5).

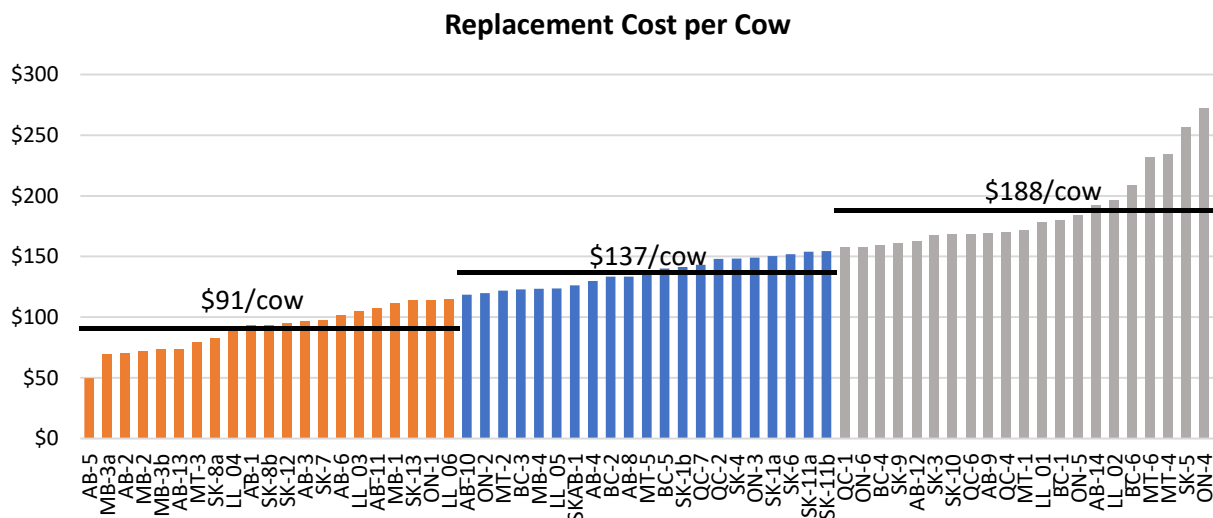


Figure 5. Replacement Cost per Cow by Low, Medium and High Replacement Cost Groups

Driving Factors for Cow Herd Replacement Cost

There is a general relationship between higher replacement rates and higher replacement costs, but it is not the sole determinant. Farms with higher replacement can achieve lower replacement costs through efficient cost management.

What drives the differences in replacement cost per cow between the Low, Medium, and High groups? To explore this, we examined three key factors:

- Replacement rate
- Cost of developing heifers (including feed cost, land cost, breeding cost, labour, and other overhead such as machinery, energy and tax)
- Opportunity cost (revenue forgone from not selling heifer calf at weaning)

Replacement Rate

Replacement rate is primarily influenced by cow open rate, death loss, culling decisions, and overall herd management strategies. It can be viewed as an indicator of the longevity of breeding females.

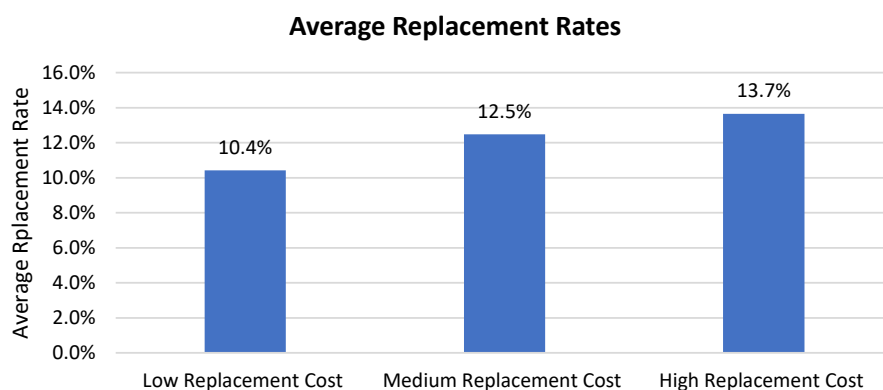


Figure 6. Average Replacement Rate by Low, Medium and High Replacement Groups

Generally, a higher replacement rate means that cows are being replaced more frequently and is associated with higher replacement costs because more heifers are needed to maintain herd size. This could lead to higher expenses in raising or purchasing these replacements, but not always.

Table 3. Statistical Analysis on Replacement Rate

Groups by Replacement Cost per Cow	Avg Replacement Rate	<i>P</i> -value	Statistically Significant Difference between the Means of the Groups
Low	10.4%	--	--
Medium	12.5%	0.03	Yes, between Low and Medium groups
High	13.7%	0.22	No, between Medium and High groups

In the comparison of replacement cost groups, farms with a low replacement cost per cow have an average replacement rate of 10.4%, whereas those with medium replacement costs have a higher average replacement rate of 12.5%. The *P*-value between these two groups is 0.03, indicating a statistically significant difference in their means. However, the high replacement cost group, with an

average replacement rate of 13.7%, did not show a statistically significant difference when compared to the medium-cost group, with a *P-value* of 0.22 (Table 3). This indicates that while higher replacement rates often correspond to higher costs, the relationship may not always hold, depending on other influencing factors.

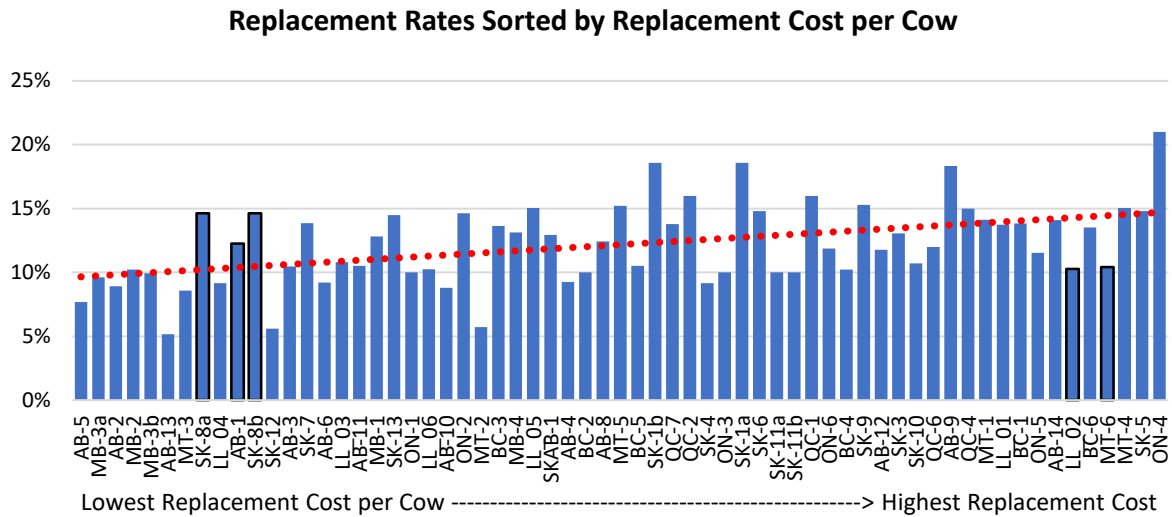


Figure 7. Replacement Rates Sorted by Replacement Cost per Cow

Replacement rate is not the sole determinant of replacement costs. Some farms, like SK-8a,b and AB-1 (Figure 7), maintain relatively low replacement costs despite having higher replacement rates. This suggests that other factors—such as lower-cost heifer development—help offset the potential cost increases associated with a higher replacement rate. Thus, while there is a general relationship between higher replacement rates and higher replacement costs, efficient management practices can help farms mitigate costs associated with higher replacement rates.

Conversely, farms with lower replacement rates do not necessarily experience the lowest replacement costs (e.g. LL_02 and MT-6). In some cases, the expenses incurred to improve open rates or reduce cow death losses may outweigh the benefits gained. It is important to consider the optimal replacement rate, rather than focusing solely on minimizing open rates and death losses, to achieve cost efficiency.

Development Cost

Development cost of replacement heifers includes feed cost, land cost, breeding cost, labour, and other overhead such as machinery, fuel and tax. It is another key factor for replacement cost for the cow herd.

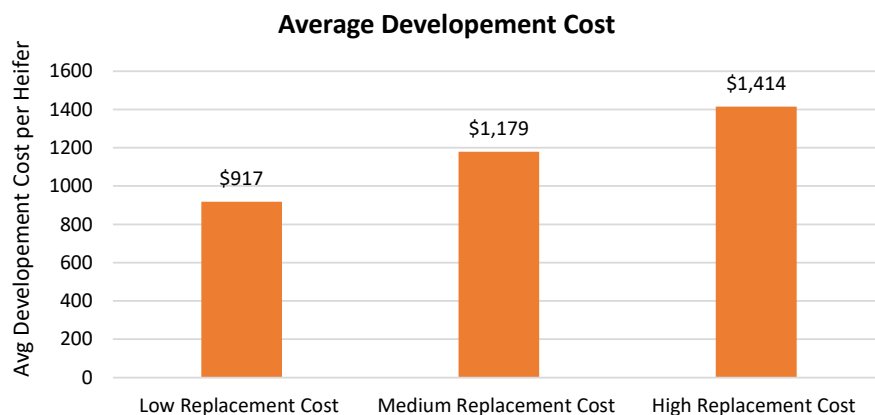


Figure 8. Development Costs by Low, Medium and High Replacement Cost Groups

Table 4. Statistical Analysis on Heifer Development Cost

Groups by Replacement Cost per Cow	Avg Development Cost	P-value	Statistically Significant Difference between the Means of the Groups
Low	\$917	--	--
Medium	\$1,179	0.01	Yes, between Low and Medium groups
High	\$1,414	0.03	Yes, between Medium and High groups

In the comparison of replacement cost groups, the Low-cost group has an average heifer development cost of \$917, whereas those with Medium and High groups average at \$1,179 and \$1414, respectively (Figure 8). There is statistically significant difference between the means of the Low and Medium groups, and the Medium and High groups (Table 4), indicating that development cost is a significant factor influencing replacement costs.

For example, farms SK-8a,b and AB-1 have managed to keep their replacement costs lower despite having higher replacement rates (Figure 9). This is attributed to their relatively low development costs, which are among the lowest of all benchmark farms. Conversely, farms LL-2 and MT-6, despite having relatively low replacement rates, experience higher replacement costs per cow due to their higher development costs (Figure 9).

Farms with lower development costs can still maintain lower replacement costs, even with higher replacement rates. However, there is no one-size-fits-all approach to managing heifer development costs. For instance, the lower costs on SK-8a and b are driven by economies of scale with a large herd size (950 head), while AB-1 (212 head) achieves lower costs through reduced spending on labor, buildings, machinery, and capital.

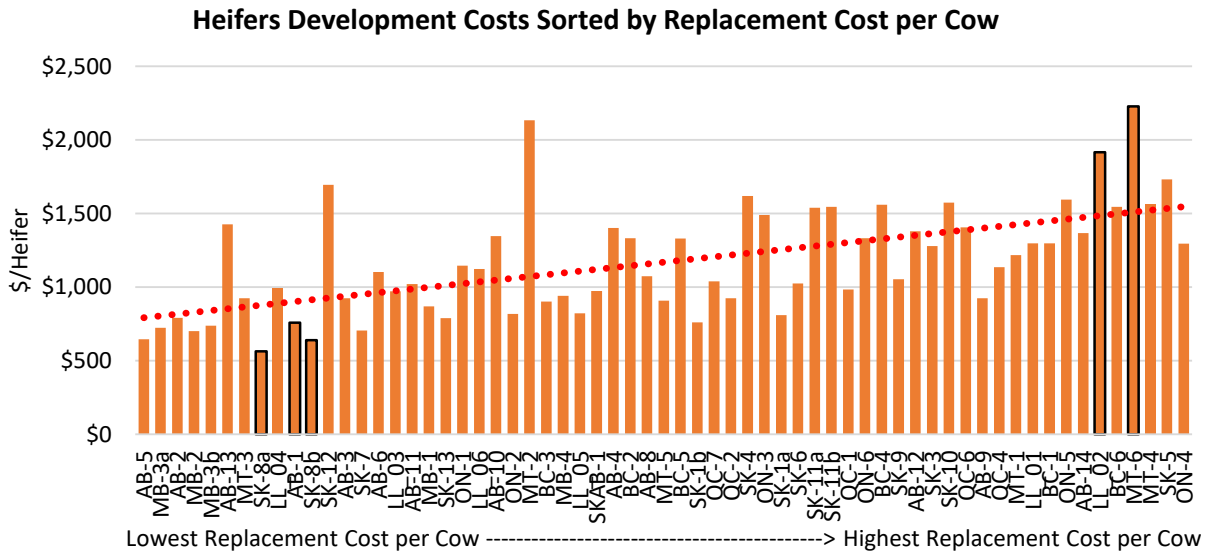


Figure 9. Heifer Development Cost Sorted by Replacement Cost per Cow

Opportunity Cost of not Selling Heifer Calves at Weaning

Opportunity costs across different replacement cost groups show no statistically significant differences (Table 5). This suggests that the opportunity cost of not selling a calf at weaning remains similar, regardless of replacement costs. This is likely due to the limited control producers have over calf prices, making opportunity costs more dependent on market conditions than on internal management.

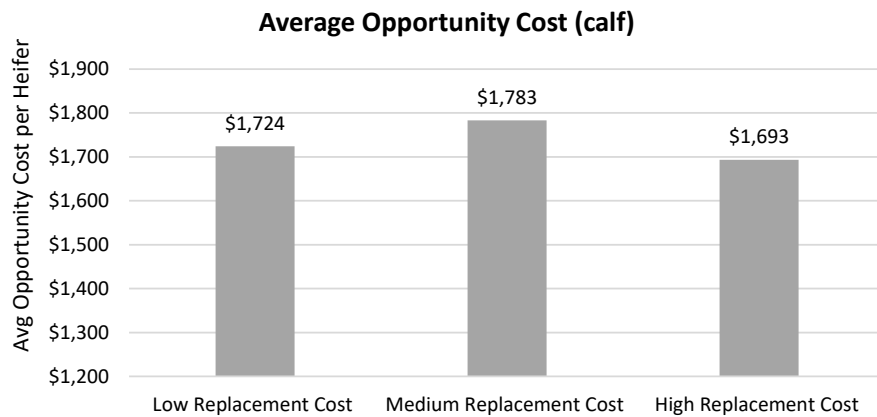


Figure 10. Opportunity Cost by Low, Medium and High Replacement Cost Groups

Table 5. Statistical Analysis on Opportunity Cost

Groups by Replacement Cost per Cow	Avg Opportunity Cost*	P-value	Statistically Significant Difference between the Means of the Groups
Low	\$1,724	--	--
Medium	\$1,783	0.46	No, between Low and Medium groups
High	\$1,693	0.31	No, between Medium and High groups

* Opportunity cost of not selling the calf at weaning, not including opportunity costs on land, labour and capital

Conclusion

In conclusion, raising replacement heifers is a significant investment with long-term implications for profitability. The forgone revenue from not selling calves is a substantial opportunity cost of retaining heifers for replacement. The payback period of replacement heifers varies widely depending on cost structure, market condition and cow longevity. Effective cost control and efficient management are essential for optimizing replacement strategies and maximizing profitability.

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