



#06 September 2022

2021 Results

Executive Summary

The 2021 Canadian Cow-calf Cost of Production Network (COP Network), adding to the previous work of the 2020 COP Network, is comprised of 46 cow-calf and 3 dairy-beef benchmark farms created with participation from 186 producers across Canada. Farms within the COP Network represent a variety of Canadian production systems, including variation in animal performance, economies of scale, labour productivity, feeding, and farm financials.

Since the original set of benchmark farms in the 2020 COP Network, efforts have been made to include production systems previously not represented, including larger herds (particularly in the west) and a broader range of farm sizes within the individual provinces. Some production systems are still unrepresented in the COP Network, including farms that feed primarily by-product feedstuffs, farms that practice year-round grazing, organic/regenerative farms, and grass finishing operations. These areas will be targeted in subsequent additions to the COP Network.

The COP Network provides detailed information to producers who have similar production systems as the benchmark farm. As such, data presented in the benchmark farms are different than other avenues of characterizing Canadian cow-calf production systems, such as the 2017 Farm Management Survey (FMS) and 2017 Western Canadian Cow-calf Survey (WCCCS).

Given the widespread drought conditions in 2021, data collected in 2020 and 2021 also allow for comparison of production costs between a drought and non-drought year, particularly those related to feeding.

Cost takeaways

Total average costs from the COP Network were \$1,519/cow in 2021. Of these, 61% (\$925) were cash costs, 11% (\$162) were depreciation, and the remaining 28% (\$432) were opportunity costs. Most (80%) farms covered short-term (cash) costs, as well as medium-term (cash and depreciation) costs (61%). A smaller proportion of farms (13%) were able to cover long-term (cash, depreciation, and opportunity) costs.

Those farms able to cover long-term costs typically had other enterprises or on-farm activities generating additional revenue. Rather than look to off-farm work for income, these operations

focused on building positive economies of scale and multiple farm enterprises. For example, farm SK-8a saw the lowest total costs per cow. With the large herd size (950 head of beef cows, the largest in the COP Network) and additional yearling grasser and cash crop operations, this farm has achieved both economies of scale and multiple successful farm enterprises and is one of few farms in the COP Network to achieve long-term profitability.

Future of the COP Network

The value of the COP Network to producers is the opportunity to compare their current operation to a similar production system benchmark farm. While 2021 additions to the COP Network have improved representation, not all types of production systems are represented. As mentioned above, subsequent additions to the COP Network in 2023 will aim to fill some of these gaps in representation.

Introduction

The Canadian Cow-calf Cost of Production Network (COP Network) is the first standardized cost of production information for the cow-calf sector, available from every province across Canada. Using standardized data allows for comparison of information within and between provinces, as well as with cow-calf production systems world-wide.

In 2021, 21 benchmark farms (two in B.C., four in Alberta, four in Saskatchewan, three in Manitoba, one in Ontario, three in Quebec, and four in the Maritimes) were added to the 25 cow-calf and 3 dairy-beef benchmark farms created in 2020. With this, the COP Network is comprised of 49 benchmark farms, 46 cow-calf and three dairy-beef and has 186 participating producers. In total, four benchmark farms are located in B.C., 10 in Alberta, 10 in Saskatchewan, five in Manitoba, four in Ontario, seven in Quebec, and six cow-calf and three dairy-beef operations in the Maritimes. Farms from the 2020 COP Network were forward indexed to 2021, and all farms were backward indexed five years. The combined dataset of the 46 cow-calf farms is discussed below. All this data, as well as individual farm summaries, can be found at canfax.ca.

The benchmark farms of the COP Network are based on specific production systems. Producers can select the benchmark farm that most closely resembles their operation, regardless of provincial boundaries. This system also accounts for the inherent variation that can be found in production systems present both within and between provinces. From this variation in production systems will stem differences in cost structure that allow for interesting comparison and analysis of the various production systems. The addition of more benchmark farms in 2023 will account for further variety in production systems and thus more comprehensive cost of production information amid the various Canadian cow-calf systems.

Overall, per cow total production costs and cash costs on all benchmark farms show a typical upward sloping curve (Figure 1a, 1b).

Figure 1a. Total costs (\$/cow) on benchmark farms in 2021

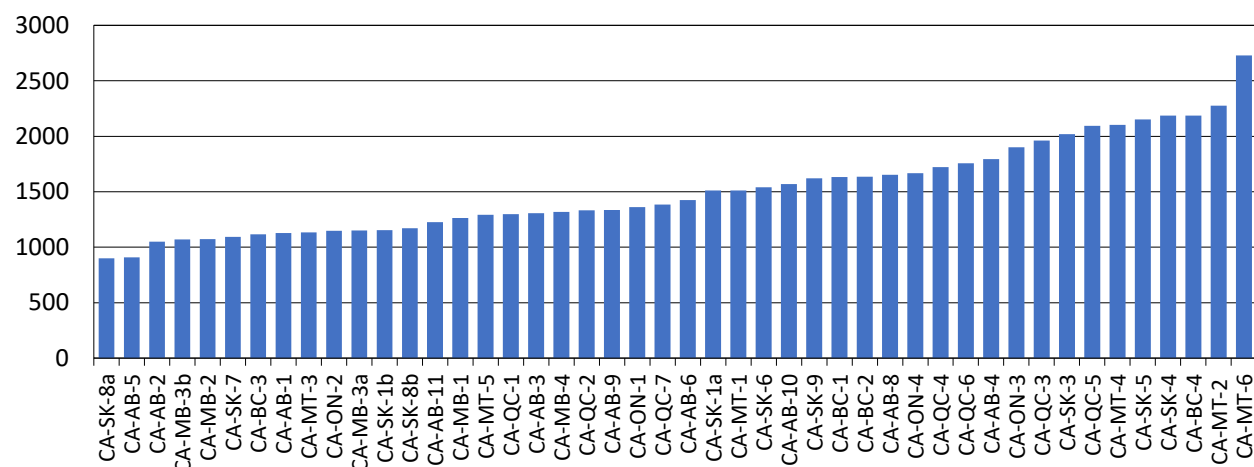
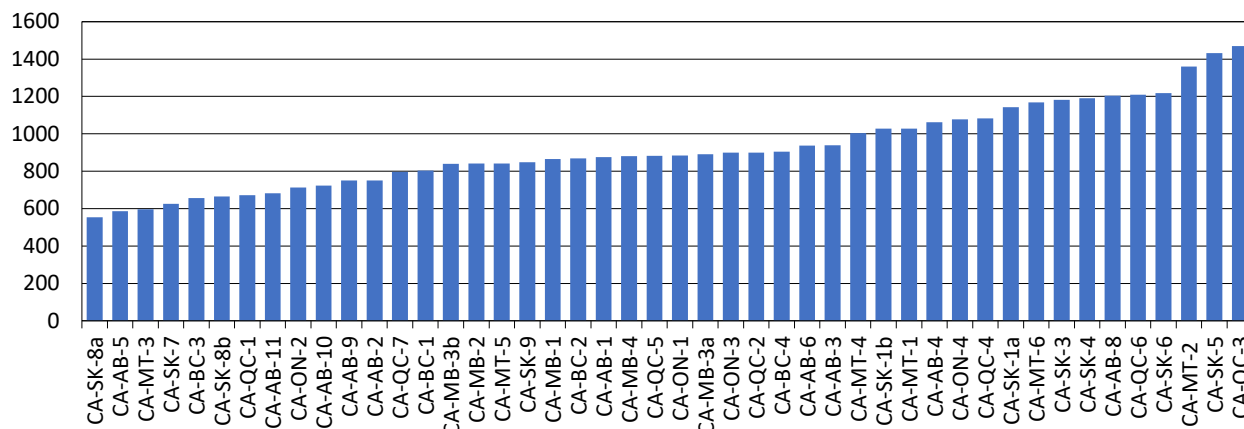


Figure 1b. Cash costs (\$/cow) on benchmark farms in 2021



Drought Year Considerations

In 2021, cow-calf producers were faced with drought and subsequent feed shortages. As such, 2021 production data may be atypical, and effects of drought conditions should be considered when interpreting this data. In general, there are three ways cow-calf producers respond to drought conditions and feed shortages:

1. Liquidation of the cow herd. This increases revenue, but producers who rely on government programming with inventory requirements may struggle later with cash flow and rebuilding the herd.
2. Purchase feed. This increases production costs. Government programs may or may not compensate producers for added costs.
3. Utilize stockpiled feeds and government programs (increase margin).

Forward indexing of the 2020 COP Network benchmark farms evaluated feed shortages as well as feed purchases, as individual farms varied in typical feed carryover.

Geographic Locations

The benchmark cow-calf operations are distributed throughout the provinces in various ecoregions to provide national coverage. Fifty-four percent of cow-calf benchmark farms (25 of 46) are in the prairies as this is where the majority (84%) of the beef cow herd is located. Oversampling in Eastern Canada is deliberate, to fill existing gaps in the data.

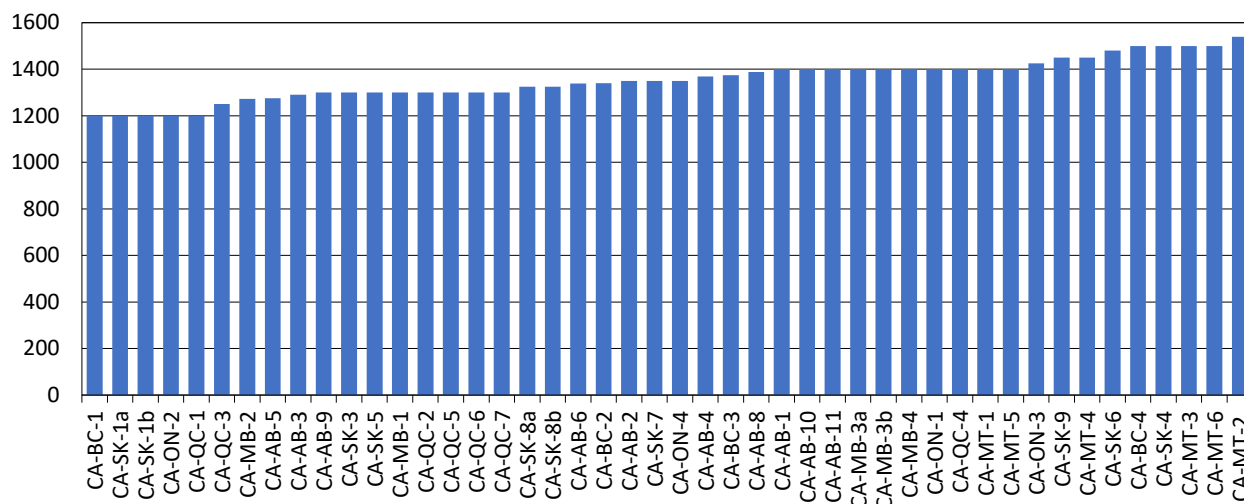
Animal Performance

Animal performance metrics from the COP Network will be compared here to those from the 2017 FMS and WCCCS, where applicable. These comparisons provide an indication of the robustness of the COP Network dataset and highlight where differences in the data occur. Limitations and assumptions associated with these differences should be kept in mind when interpreting the results of the COP Network.

Mature cow weight

Mature cow weights on the benchmark farms ranged from 1,200 lb to 1,540 lb (MT-2) (Figure 2). Average mature cow weight was 1,355 lb. This is similar to average mature cow weight reported in the 2017 WCCCS (1,374 lb), though higher than that reported in the 2017 FMS (1,256 lb). Mature cow weight in the 2017 FMS ranged from 1,196 lb in Ontario to a high of 1,299 lb in Saskatchewan; 80% of operations in the 2021 COP Network had cows above this weight range.

Figure 2. Mature cow weight (lb) on benchmark farms in 2021



Weaning weight

Weaning weights averaged 555 lb across benchmark farms. The lowest weaning weights were on MB-3a and MB-3b, at 444 lb, and the highest at 708 lb on SK-6 (Figure 3a). Across farms, weaning weights tended to decline with larger herd sizes. As with mature cow weight, this is higher than average weaning weight (523 lb) reported in the 2017 FMS.

To account for differences in weaning age, 205 day adjusted weaning weight was calculated (Figure 3b). The 205 day adjusted weaning weight averaged 544 lb, ranging from 444 lb (AB-5) to 699 lb (SK-5). Adjusted weaning weight reported in the 2017 FMS was 529 lb.

As a percentage of mature cow weight, 205 day adjusted weaning weights were 41% (32% - 51%) in the COP Network, and 43% (41% in Manitoba – 45% in B.C.) in the 2017 FMS. Even though both mature cow weights and adjusted weaning weights are heavier in the COP Network farms than the 2017 FMS, both the COP Network and 2017 FMS maintain similar values for this metric.

Figure 3a. Weaning weight (lb) on benchmark farms in 2021

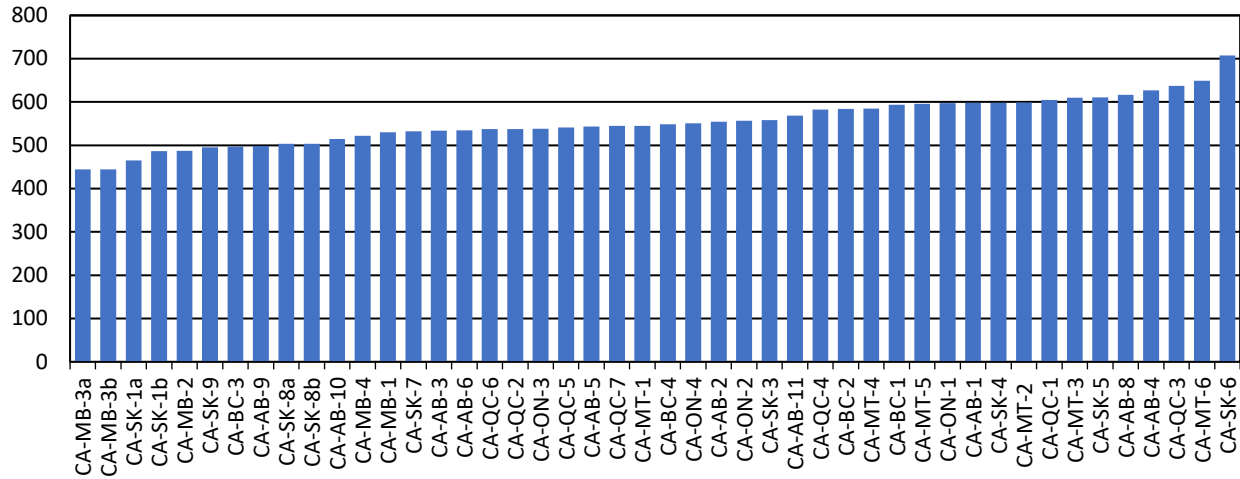
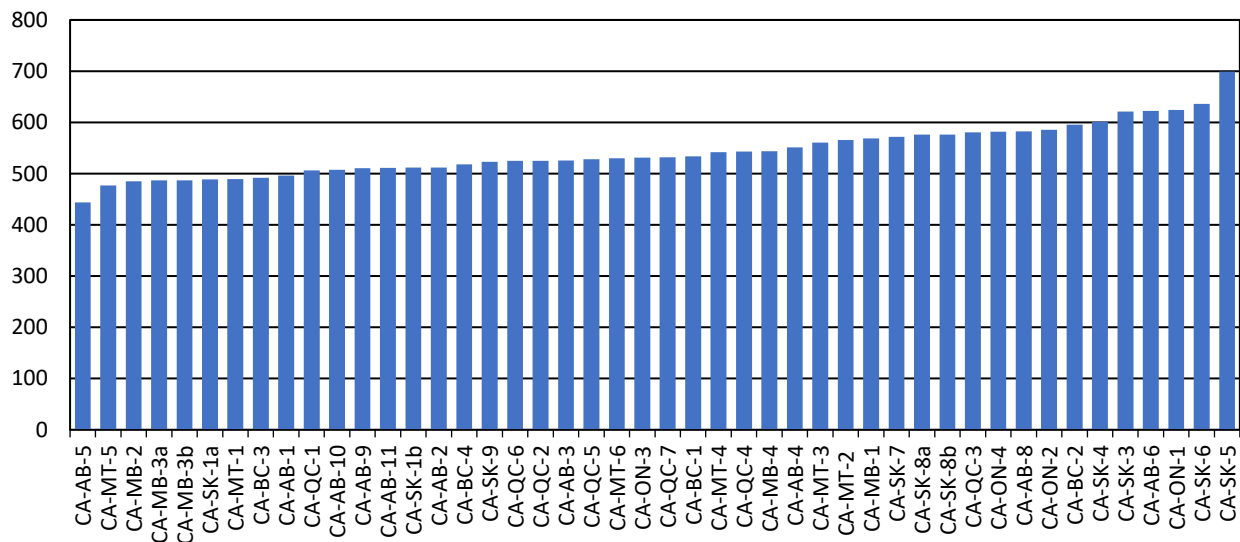


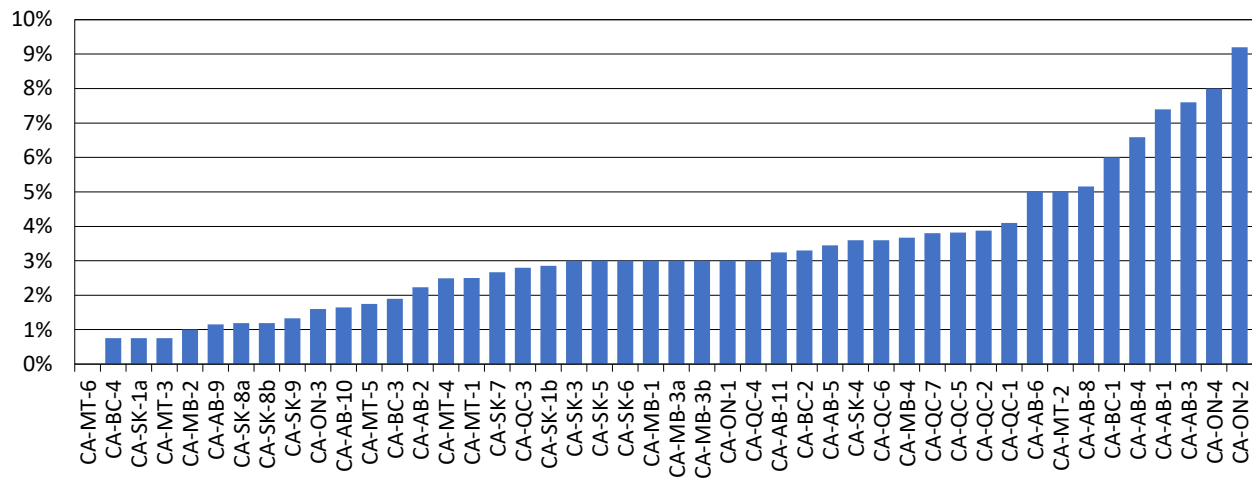
Figure 3b. 205 day adjusted weaning weight (lb) on benchmark farms in 2021



Calf mortality and weaning rate

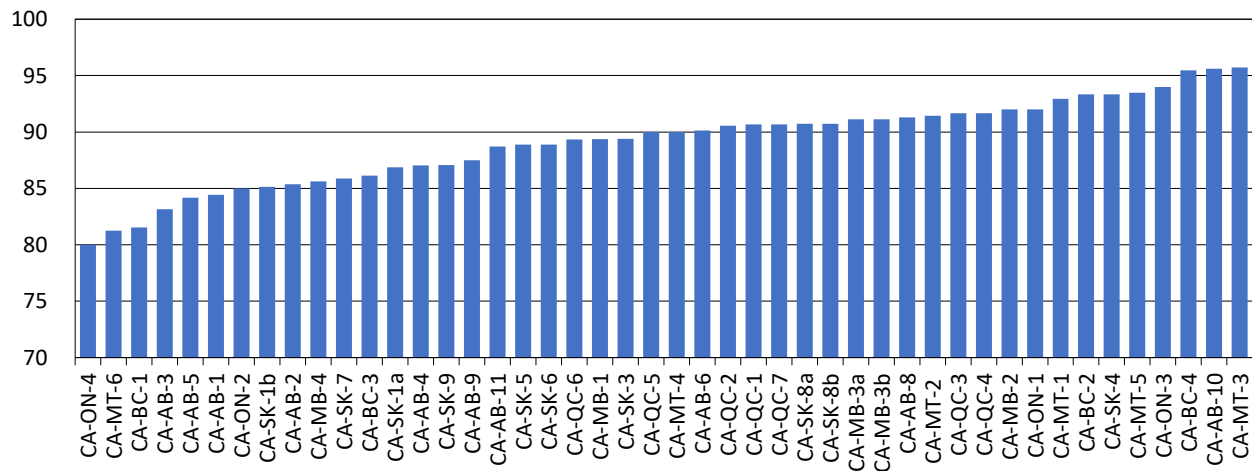
For the COP Network, calf death loss is calculated for calves from 24 hours old to weaning. Calf death loss averaged 3.3% and ranged from as low as 0.0% on MT-6, to 9.2% on ON-2 (Figure 4). On the latter farm, high death loss is related to large carnivore predation, illustrating the influence geographic region may have on this metric. It should be noted that reported calf mortality does not reflect calf losses within the first 24 hours, which may be positively or inversely related to death loss over 24 hours on an individual farm. This metric may also be skewed by herd size – two calves lost equates to a 10% death loss in a herd with 20 calves, but only 2% in a herd with 100 calves.

Figure 4. Calf mortality (%) on benchmark farms in 2021



Related to calf death loss is weaning rate (Figure 5). Farms in the COP Network weaned an average of 89 calves per 100 cows. Benchmark farm ON-4 weaned the fewest calves per 100 cows (80), and AB-10 and MT-3 the highest (96 calves each). Again, this is higher than values reported on the 2017 FMS, which found average weaning rates of 81% for cows and 72% for heifers. The higher weaning rates seen in the COP Network will be reflected in measures of farm profitability and may indirectly speak to the profitability of operations participating in the COP Network versus the 2017 FMS.

Figure 5. Weaning rate (calves weaned per 100 cows) on benchmark farms in 2021



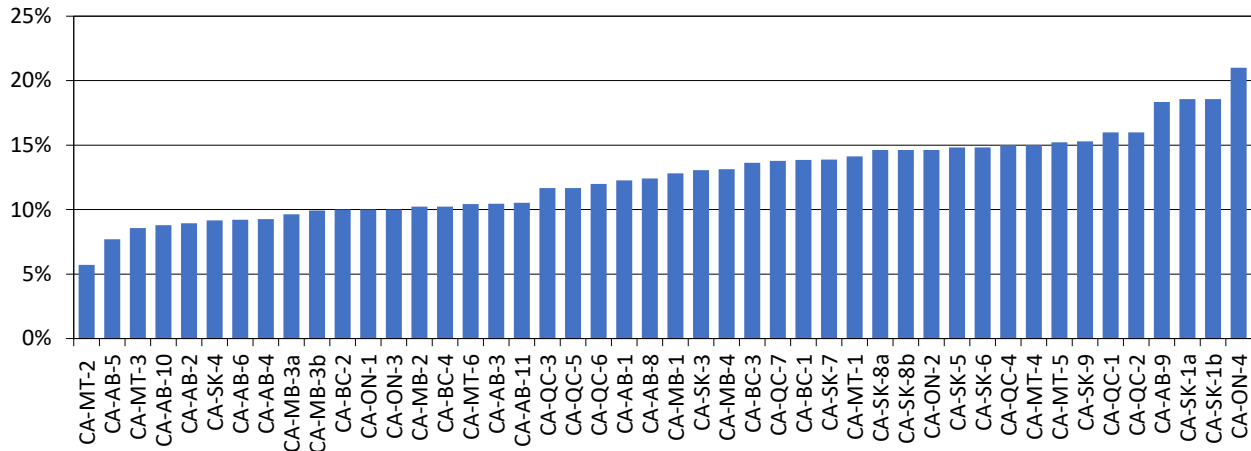
Replacement rate

The COP Network define replacement rate as the number of cull cows plus the number of cows that have died as a percentage of total cows on the operation (Agri Benchmark, 2015). Average replacement rate amongst the benchmark farms was 13% and ranged from 6% (MT-2) to 21% (ON-4) (Figure 6). The 2017 WCCCS reported an average cull rate of 11.7%, which is not dissimilar to an average replacement rate of 12.4% amongst COP Network farms in Western Canada (B.C., Alberta, Saskatchewan, and Manitoba).

Operations with higher replacement rate inherently have younger herds, as cows are culled earlier after fewer reproductive years. However, as depreciation increases with increasing cow age (See Equation 1), cows culled at a younger age will have higher salvage value (Berger, 2014).

$$\text{Equation 1: Cow depreciation} = \frac{\text{Purchase price or Replacement cost} - \text{Salvage Value}}{\text{Productive years in the herd}}$$

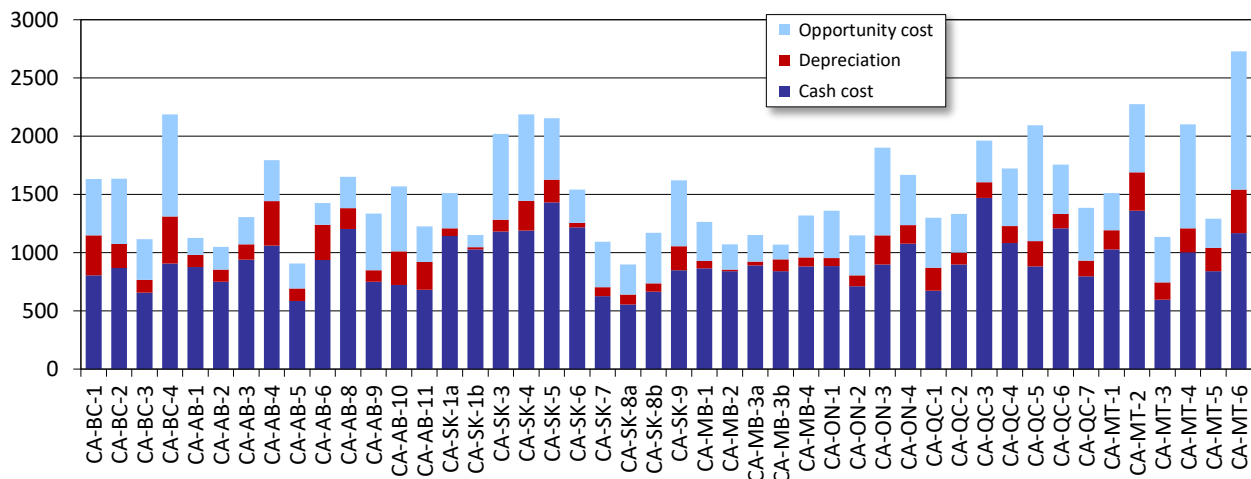
Figure 6. Replacement rate (%) on benchmark farms in 2021



Cow-calf profitability

Nationally, average total production costs were \$1,519/cow in 2021. This ranged from a low of \$899/cow on SK-8a to \$2,728 on MT-6. Cash costs, too, varied from \$554/cow on SK-8a to \$1,469 on QC-3, with an average cash cost of \$925/cow. While sample sizes are still small and therefore not representative of a true provincial average, the highest total costs were seen in the Maritimes (\$1,840/cow) and Quebec (\$1,651/cow), and the lowest in Manitoba (\$1,175/cow) and Alberta (\$1,339/cow). Cash costs were highest in Quebec (\$1,002/cow) and the Maritimes (\$1,000/cow), and lowest in B.C. (\$809/cow) and Alberta (\$851/cow). See Figure 7 for a breakdown of per cow cash, depreciation, and opportunity costs by individual farm.

Figure 7. Cash, depreciation, and opportunity costs (\$/cow) on benchmark farms in 2021



On average, total costs in 2021 increased 12% from the 2020 average (\$1,362/cow) for the 46 benchmark farms. Individually, cash, depreciation, and opportunity costs increased 17%, 3%, and 4%, respectively. The increase in costs, particularly cash costs, is driven primarily by the drought conditions and feed shortages experienced in 2021.

Eighty percent of farms (37 of 46) were able to cover short-term (cash) costs (Figure 8a). Sixty-one percent (28 of 46) were also able to cover medium-term (cash and depreciation) costs (Figure 8b). However, only 13% (6 of 46) were able to cover long-term (cash, depreciation, and opportunity) costs (Figure 8c). A visualization of short-, medium-, and long-term profits by individual farm is provided in Figure 9.

Figure 8a. Short-term profits (returns - cash costs) (\$/cow) on benchmark farms in 2021

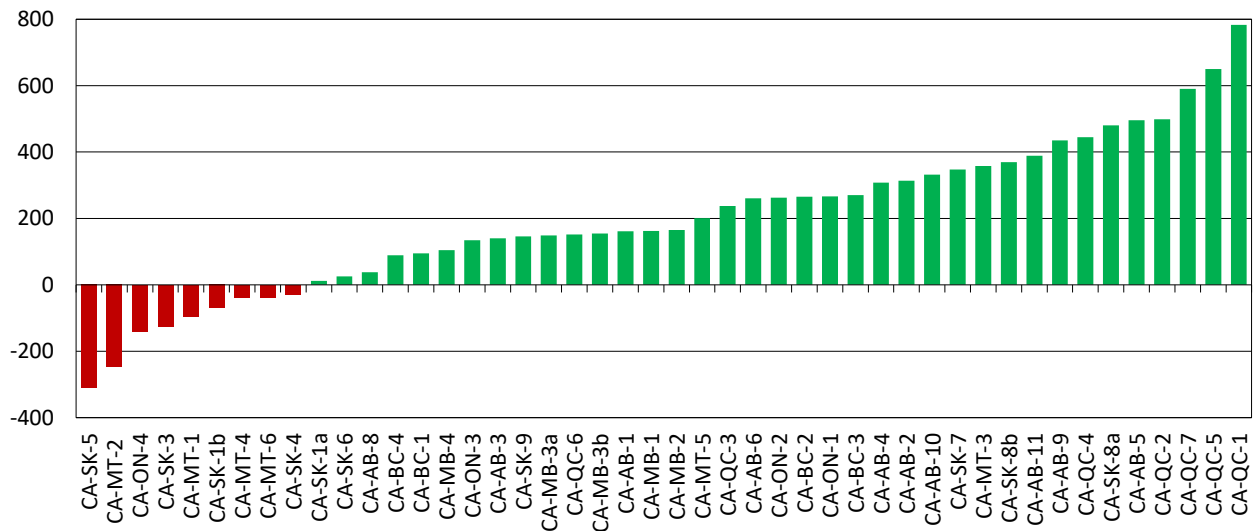


Figure 8b. Medium-term profits (returns - cash and depreciation costs) (\$/cow) on benchmark farms in 2021

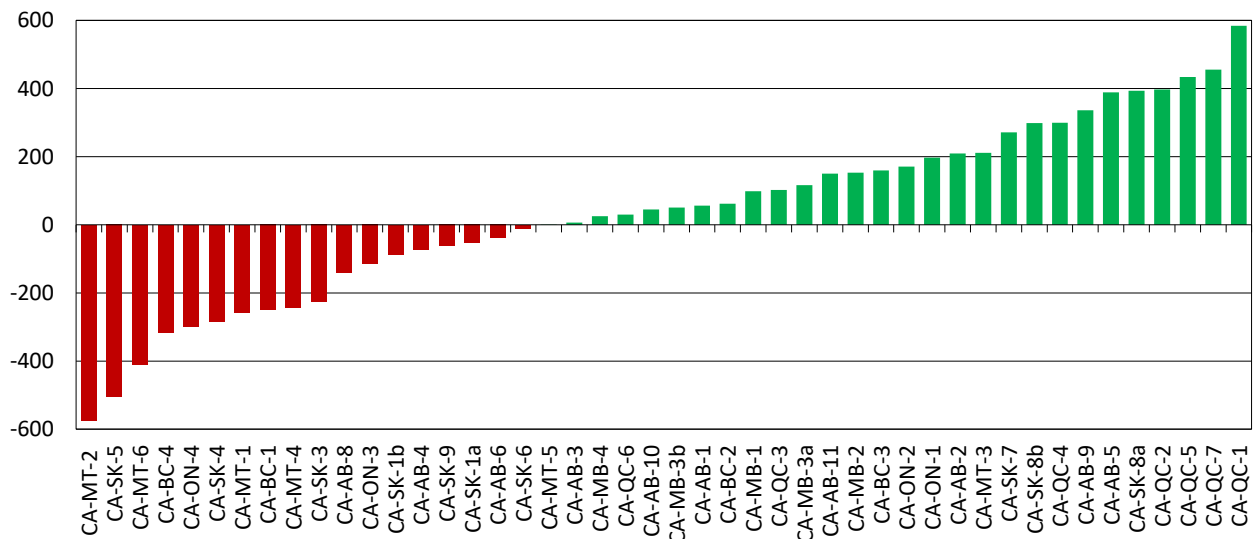


Figure 8c. Long-term profits (returns - cash, depreciation, and opportunity costs) (\$/cow) on benchmark farms in 2021

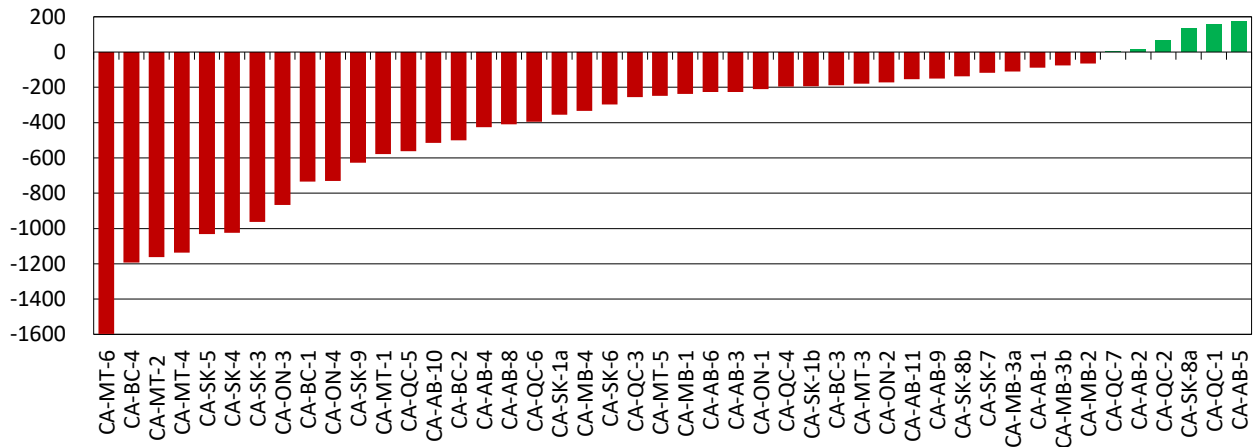
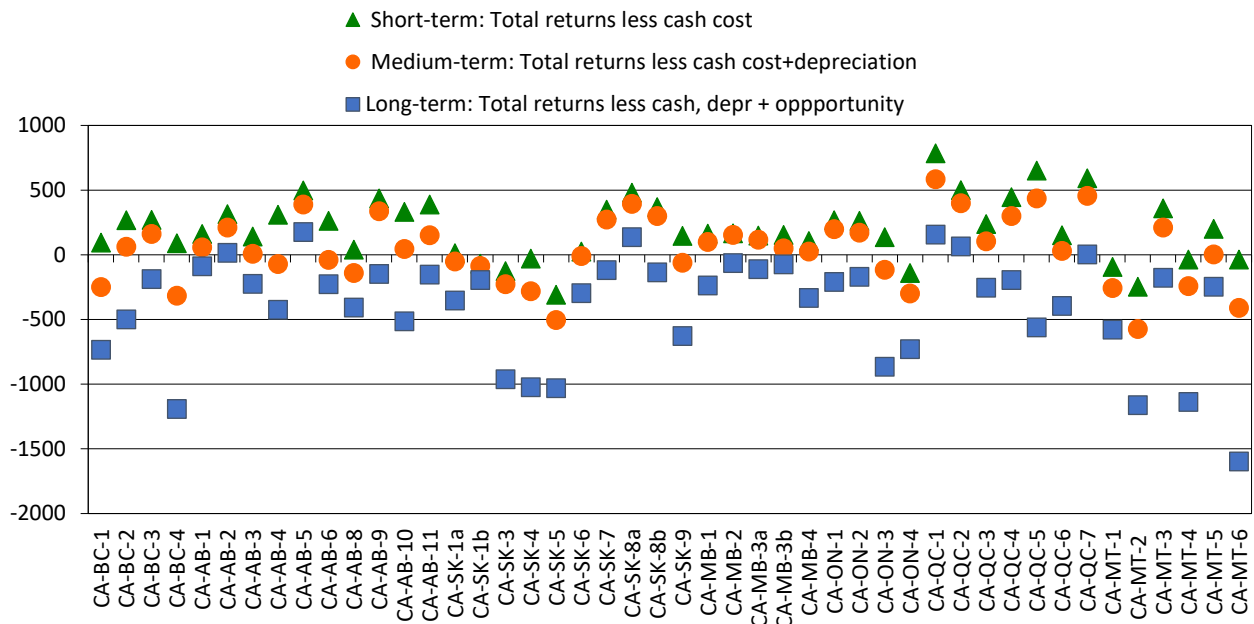


Figure 9. Short-, medium-, and long-term profits (\$/cow) on benchmark farms in 2021



Economies of Scale

The 2021 COP Network covers a range of herd sizes, within provinces and nationally. Herd sizes range from 35 head of beef cows (MT-2) to 950 head (SK-8a, SK-8b) (Figure 10). This is an improvement upon the 2020 COP Network that was under-representative of larger herd sizes, particularly in Western Canada. Still, the COP Network dataset is skewed towards small- and medium-sized farms. Per the 2021 Census of Agriculture, farms with >250 beef cows account for 5% of beef farms, and 32% of the beef cow herd (Figure 11); in the 2021 COP Network, 26% of farms have >250 beef cows.

Figure 10. Beef cow herd size on benchmark farms in 2021

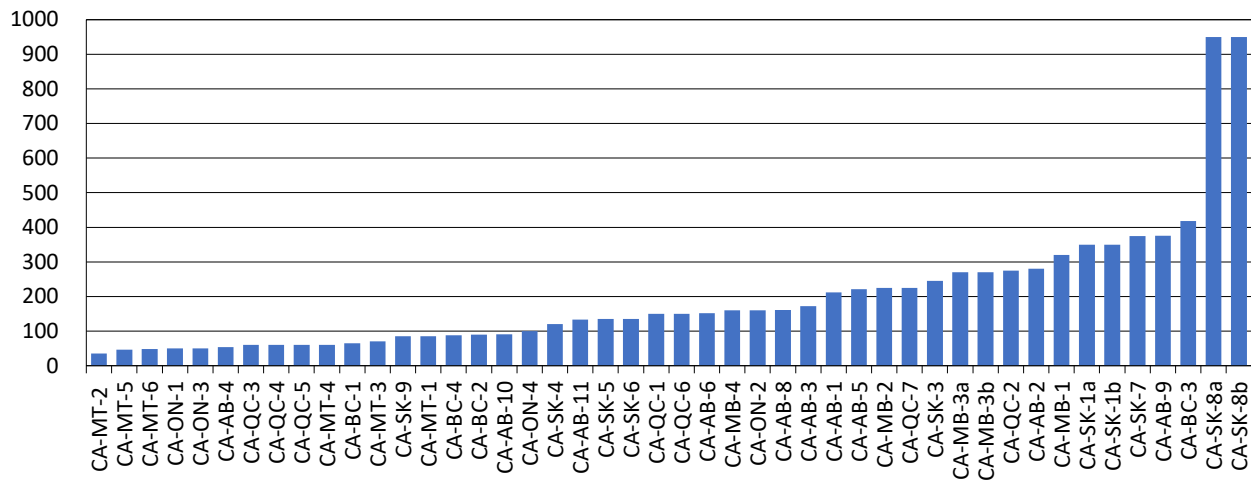
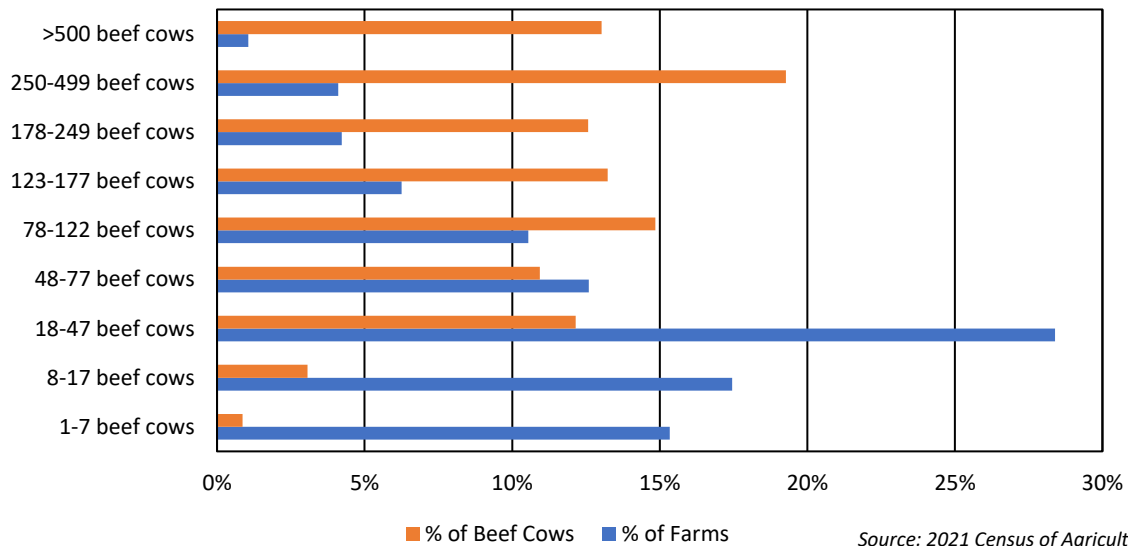
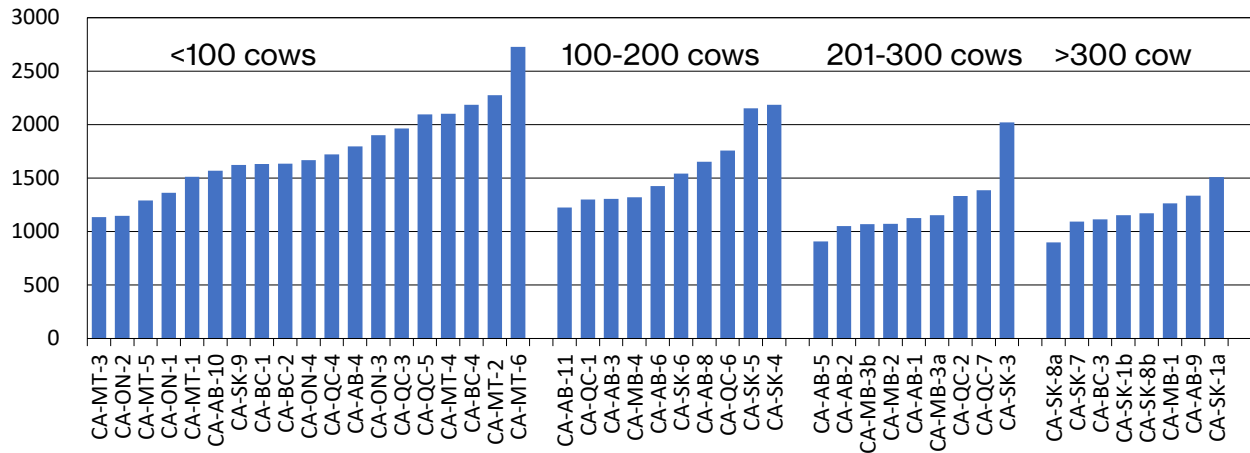


Figure 11. Profile of Canadian beef cattle operations by beef cow herd size



Economies of scale are defined as decreasing production costs with increasing units of output. On farms within the COP Network, larger herd sizes experience lower per cow production costs (Figure 12), illustrating economies of scale. This holds true even at the largest herd size (950 head each on SK-8a and SK-8b). Each herd size category in Figure 12 shows an upward sloping curve that indicates opportunities for improvement in per cow costs within each category. This upward slope is flattest amongst the largest herd sizes (>300 head); at large herd sizes, there is risk of experiencing diseconomies of scale, where per cow costs begin to increase. The largest herd sizes in the COP Network, though, SK-8a and SK-8b (950 head), have the lowest and highest costs within their category, again illustrating the competitiveness and opportunities for improvement within the herd size categories.

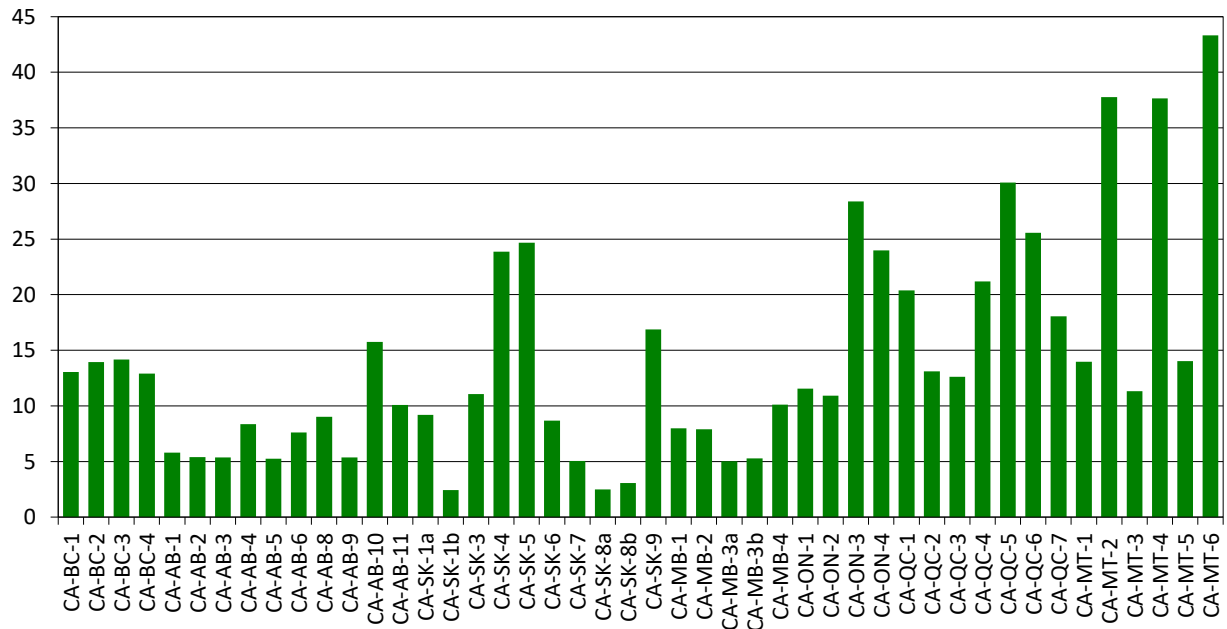
Figure 12. Total cost (\$/cow) by herd size on benchmark farms in 2021



Labour Productivity

Labour productivity, or labour hours per cow, was variable across farms in the COP Network. Average labour hour was 14 hours/cow, though this ranged from 2 hours/cow (SK-1b, SK-8a) to 43 hours/cow (MT-6) (Figure 13). Across all farms in the COP Network, labour was primarily as unpaid family labour. Unpaid family labour accounted for an average of 77% of total labour hours across all farms in the COP Network. Approximately one third of farms (15 of 46) relied entirely on unpaid family labour on their operation.

Figure 13. Labour hours per cow on benchmark farms in 2021



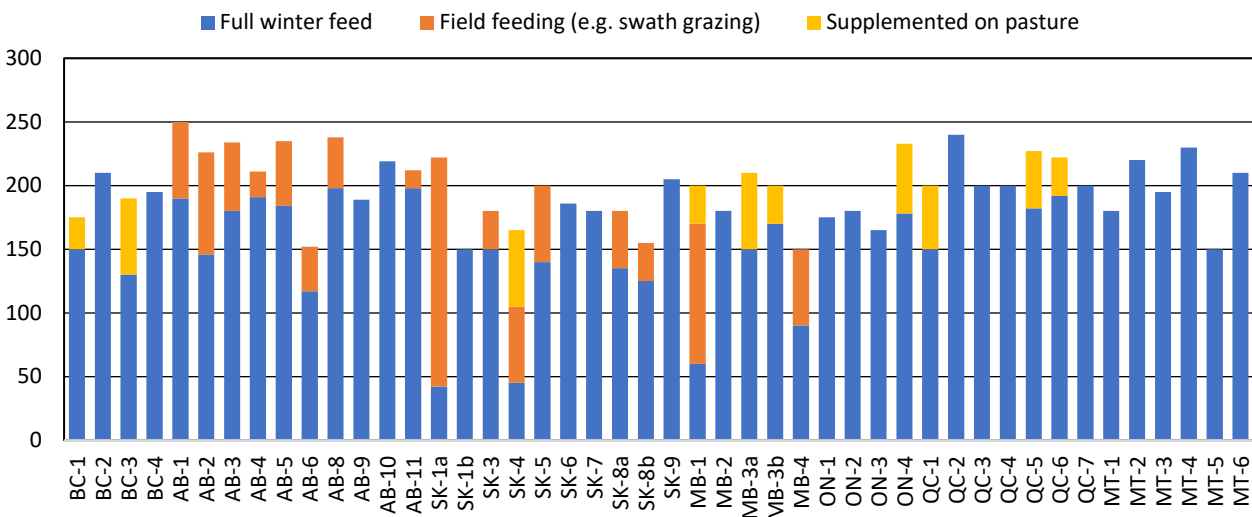
Winter Feeding Systems

Feeding costs are typically one of the highest costs incurred on cow-calf operations. The model uses the winter feed rations to calculate feed requirements and costs. Cost of production is used for homegrown feed and market value for any purchased feed. As rations are entered “as fed,” including moisture content, this may introduce error into the data, as moisture content of feedstuffs can vary with stage of maturity, weather and climate, and harvest conditions. All rations used were reviewed by a nutritionist familiar with regional weather conditions and the various feed ingredients used.

Winter feeding days

Total winter feeding days on farms in the 2021 COP Network ranged from 150 days (SK-1b, MB-4, MT-5) to 250 days (AB-1) (Figure 14). Total winter feeding days include field feeding, supplementation on pasture, and full winter feeding. Half of the farms in the COP Network (23 of 46) used field feeding/extended grazing practices, such as swath or corn grazing, and/or supplemented animals with a partial ration on pasture, prior to full winter feeding.

Figure 14. Winter feeding days on benchmark farms



Swath grazing occurred on 20% of farms in the 2021 COP Network. This is consistent with a 19% use of swath or windrow crop grazing reported in the 2017 FMS. Another 11% of farms in the COP Network grazed standing corn, which is slightly below the previously reported value of 15% in the 2017 FMS. Only four benchmark farms, or 9%, grazed residual or aftermath growth. Comparing to the 2017 FMS, this is an underrepresentation of this practice, as the FMS reported 43% of farms practicing residual or aftermath grazing.

Feed costs

A large proportion of cow-calf producers’ total cost of production is associated with winter feed costs. On average, feed costs make up 39% of total costs (cash + depreciation + opportunity costs) and 53% of medium-term costs (cash costs + depreciation) in the COP Network in 2021.

Winter feeding costs in the 2021 were also influenced by the described drought conditions. Average winter feeding costs in 2021 were estimated at \$2.92/head/day, compared to \$2.29/head/day in 2020. The lowest winter feeding costs in 2021 were seen by AB-9, at \$1.60/head/day (Table 1). Winter feeding on this farm consists of 189 days on hay and grain; only 1.4% of feedstuffs were purchased. The largest winter feed costs were \$5.31/head/day on SK-1b, where winter feeding consists of 150 days on hay, with mineral provided year-round; SK-1b purchases 100% of feedstuffs.

Jose et al. (2020) found that swath grazing was the lowest-cost method for winter feeding beef cows, followed by bale grazing, as compared to traditional methods of bale feeding in confinement. Of the nine benchmark farms in the COP Network that practiced swath grazing, five had below-average winter feeding costs. One of these farms, SK-1a, has a similar herd and farm description to SK-1b (highest winter feed costs), while differing in feed production and winter feeding strategies. SK-1a purchases 12% of feedstuffs, and practices 112 days of swath grazing, followed by 68 days of corn grazing, and finally 42 days of hay. While winter feeding costs on SK-1a were above COP Network average (\$2.92/head/day) in 2021 partially due to drought conditions, this illustrates the potential cost-savings of utilizing field feeding and/or extended grazing practices, in comparing winter feed costs to SK-1b.

Table 1. Winter feeding systems on benchmark farms in 2021

	Winter feeding days	Feed cost (\$/head/day)	Primary feedstuff
CA-BC-1	175	\$ 4.19	Hay
CA-BC-2	210	\$ 3.23	Hay
CA-BC-3	190	\$ 1.89	Hay
CA-BC-4	195	\$ 3.26	Hay
CA-AB-1	250	\$ 2.26	Silage
CA-AB-2	226	\$ 2.13	Annuals
CA-AB-3	234	\$ 2.61	Annuals
CA-AB-4	211	\$ 4.09	Hay
CA-AB-5	235	\$ 2.01	Hay
CA-AB-6	152	\$ 4.22	Hay
CA-AB-8	238	\$ 3.12	Hay/Silage
CA-AB-9	189	\$ 1.60	Hay
CA-AB-10	219	\$ 1.91	Hay
CA-AB-11	212	\$ 2.34	Annuals/Hay
CA-SK-1A	222	\$ 3.90	Annuals
CA-SK-1B	150	\$ 5.31	Hay
CA-SK-3	180	\$ 3.54	Hay
CA-SK-4	165	\$ 4.73	Annuals/Hay
CA-SK-5	200	\$ 3.37	Silage
CA-SK-6	186	\$ 3.16	Silage

CA-SK-7	180	\$ 2.21	Hay/Silage
CA-SK-8A	180	\$ 2.21	Hay
CA-SK-8B	155	\$ 3.28	Silage
CA-SK-9	205	\$ 2.80	Hay
CA-MB-1	200	\$ 2.33	Silage
CA-MB-2	180	\$ 2.87	Silage
CA-MB-3A	210	\$ 3.18	Hay
CA-MB-3B	200	\$ 3.12	Silage
CA-MB-4	150	\$ 2.47	Annuals/Hay
CA-ON-1	175	\$ 2.29	Hay/Silage
CA-ON-2	180	\$ 2.16	Hay
CA-ON-3	165	\$ 2.29	Annuals/Hay
CA-ON-4	233	\$ 2.21	Silage
CA-QC-1	200	\$ 1.97	Hay
CA-QC-2	240	\$ 2.46	Hay
CA-QC-3	200	\$ 5.26	Hay
CA-QC-4	200	\$ 3.83	Hay
CA-QC-5	227	\$ 2.50	Hay
CA-QC-6	222	\$ 2.86	Hay
CA-QC-7	200	\$ 2.33	Hay/Silage
CA-MT-1	180	\$ 3.81	Hay
CA-MT-2	220	\$ 3.00	Hay
CA-MT-3	195	\$ 1.83	Hay
CA-MT-4	230	\$ 2.88	Hay
CA-MT-5	150	\$ 2.34	Annuals/Hay
CA-MT-6	210	\$ 2.94	Hay

Benchmark farms were also categorized by primary ingredient of the winter diet (Figure 15a and Figure 15b). These were:

- Hay/haylage (includes hay/greenfeed mixed rations)
- Grazed annuals (ex. swath grazing, corn grazing, standing cover crops)
- Silage

Figures 15a and 15b show that farms utilizing any feed ingredient have the potential to be high- or low-cost. Farms feeding hay-based rations, in whole or in part, are the most prominent (76% of farms). While there were no benchmark farms in the 2021 COP Network that fed primarily by-products, this is a potential area for future data collection, given the current push to reduce food waste, and growing research into cost, processing and animal performance when using by-products.

Figure 15a. Total costs (\$/cow) by primary feedstuff on benchmark farms in 2021

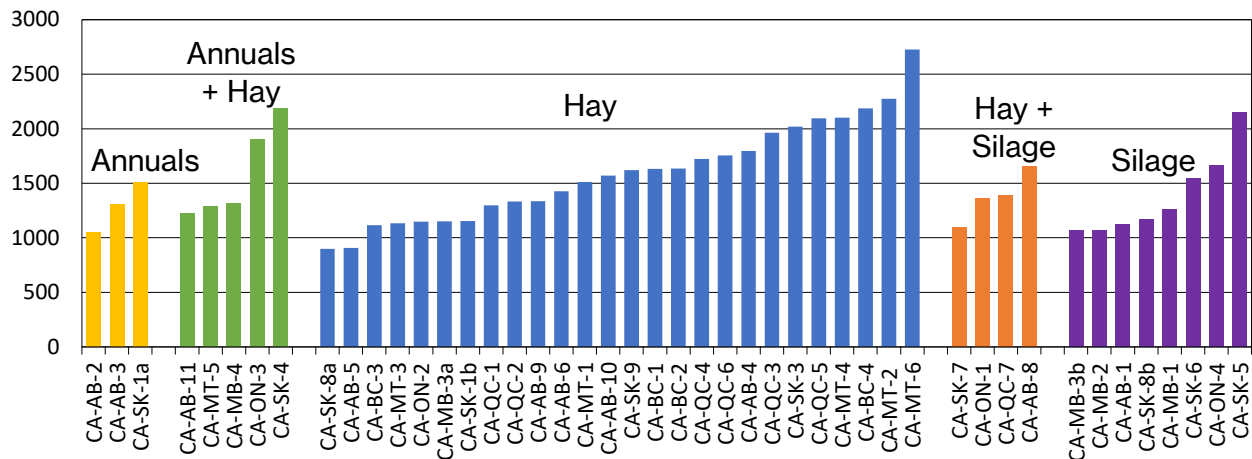
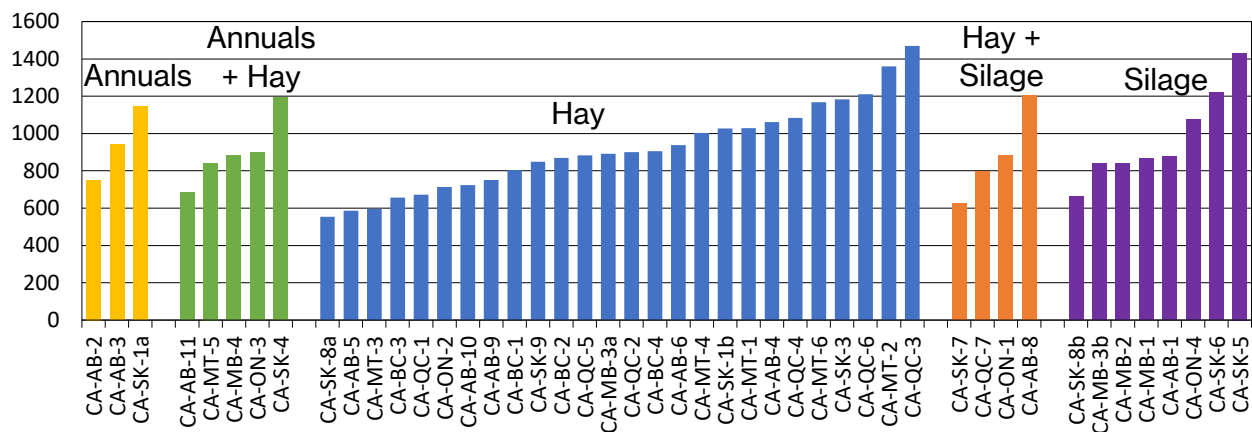


Figure 15b. Cash costs (\$/cow) by primary feedstuff on benchmark farms in 2021

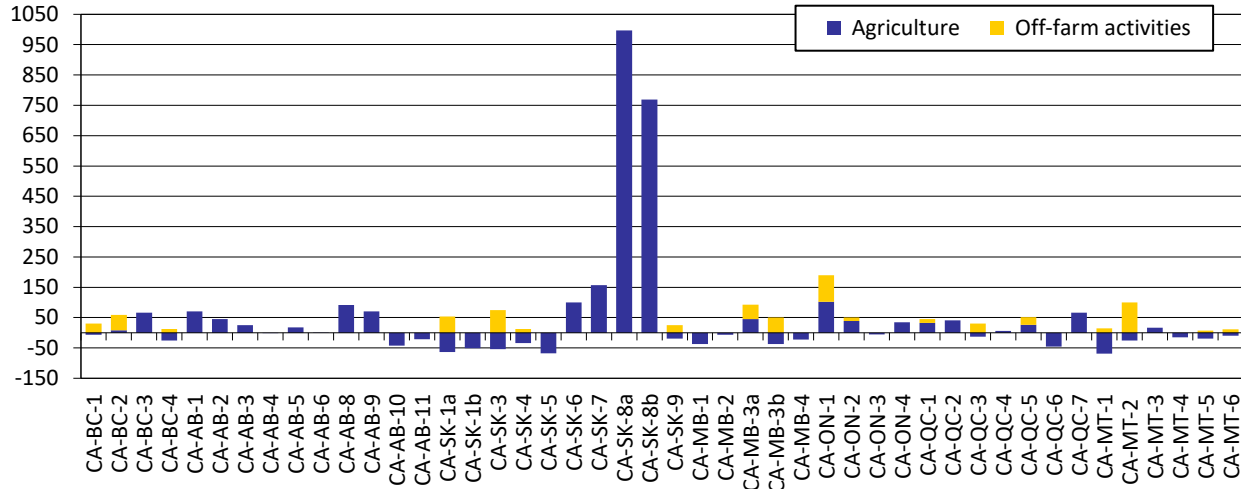


Operation Finances

Off-farm income versus farm income

The COP Network contains start-up, medium, and mature benchmark farms. It is not uncommon for farm operators, at any stage of maturity, to diversify income with multiple on-farm activities and/or supplemental off-farm income. Thirty-nine percent of farms in the COP Network (18 of 46) generate both agricultural and off-farm income, with the remainder generating only on-farm income (Figure 16). Five of the 18 farms generating off-farm income rely on this source of income to relieve the deficit of an unprofitable cow-calf enterprise and/or whole-farm operation and remain viable. SK-8a and SK-8b, with the largest agricultural income, help to illustrate the profitability associated with building economies of scale, as well as running multiple farm enterprises within an operation. These farms each have 950 head of beef cows, retain ownership as part of a yearling grasser enterprise, and produce cash crops.

Figure 16. Off-farm income versus farm income (\$1,000 CDN/year) on benchmark farms in 2021

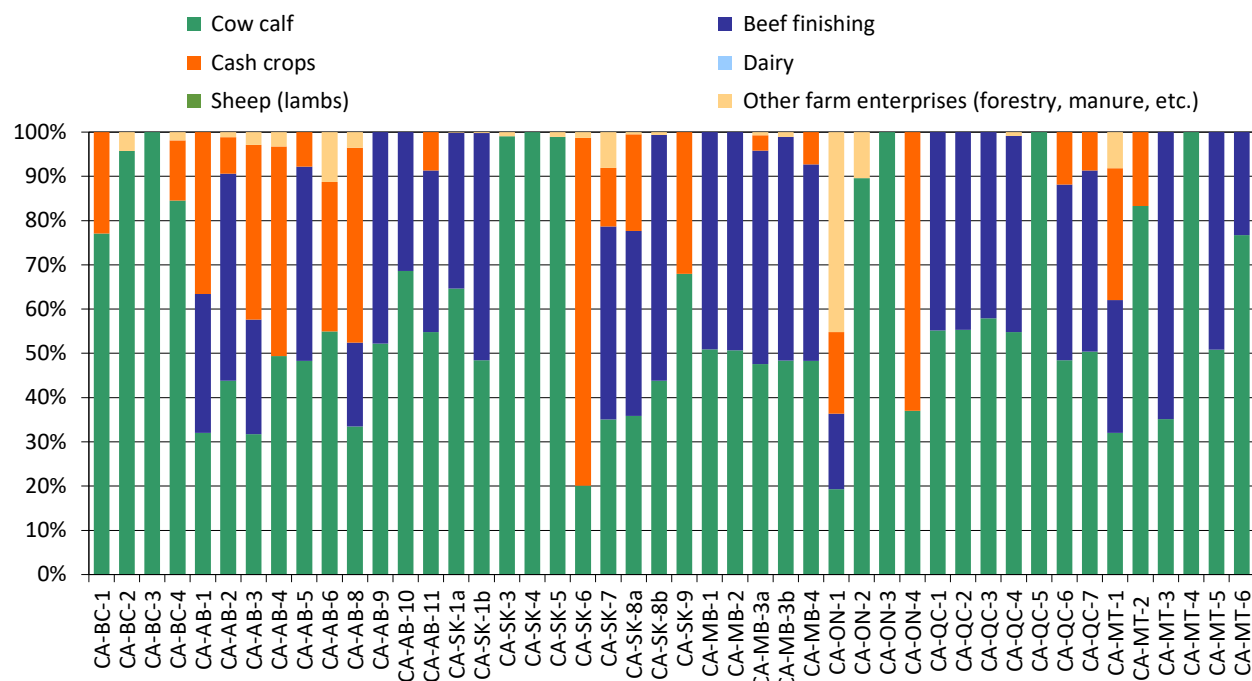


Enterprise revenue

Diversification of income is often used as a risk management tool on cow-calf operations. As many farms operate multiple enterprises, whole-farm revenue can be broken down as such. Figure 17 shows the percentage of farm revenue attributed to the different farm enterprises on each benchmark farm. To calculate the costs of each enterprise, generic allocation was used for overhead costs. This method splits overhead costs based on the percent revenues from each enterprise. The main concern is that all the overheads are covered by a mix of commodities rather than each enterprise paying its own way. For more information on generic allocation, refer to the [Methodology Fact Sheet](#).

Five farms in the 2021 COP Network received 100% of income from the cow-calf enterprise. The cow-calf enterprise accounted for $\geq 50\%$ of whole-farm revenue on 59% of farms (27 of 46), and 25-50% of income on 37% of farms (17 of 46). Only two farms (SK-6, ON-1) operated a cow-calf enterprise that accounted for $\leq 25\%$ of whole-farm revenue. Sixty-three percent of farms also ran a retained ownership (pre-conditioning, yearling grasser, backgrounding, finishing) enterprise (29 of 46), 50% produced cash crops (23 of 46), and 46% operated other farm enterprises (forestry, manure, etc.) (21 of 46).

Figure 17. Breakdown of farm revenue (% of total) by farm enterprise on benchmark farms in 2021



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