

CANADIAN DAIRY COMMISSION

COST OF PRODUCTION

Result Based on 2021 Survey Data
Indexed to Three Months Ending
August 2022

OCTOBER 2022



2021 Cost of Production (COP)

Summary

The Canadian Dairy Commission (CDC) carries out the cost of production (COP) survey annually to measure the on-farm cost of producing a hectolitre of milk (100 litres). This booklet presents the results of the annual survey.

The results of the COP survey, once **indexed to August 2022**, along with the **Consumer Price Index (CPI)**, are used in the National Pricing Formula (NPF) which determines the adjustment in percentage to be applied to producer revenues. Therefore, an increase in the **indexed cost production (iCOP)** does not necessarily mean an increase in the price of milk at the farmgate.

The NPF takes 50% of the year-over-year change in the iCOP plus 50% of the year-over-year change in CPI. Thus, it is the *change* between years that matters, not the absolute value of the iCOP.

As shown in **Table 1**, the iCOP for one standard hectolitre of milk indexed to August 2022 is \$94.44/std hl. This result is used in the annual adjustment of the farmgate price of milk, which is announced no later than November 1 each year and takes effect the following February ¹.

For more information on how the COP survey is conducted, the COP methodology, calculation, efficiency measures, and how the results affect pricing, read the CDC's Process for the Annual Cost of Production Survey and Pricing Milk at the Farm Level booklet.

Table 1. 2021 iCOP Results

iCOP indexed to August 2022 \$/std hl	
2021 iCOP	\$94.44
2020 iCOP ²	\$92.38
% change year-over-year (YoY)	+2.2%

¹Although farms sell milk, dairy processors purchase the components (protein, butterfat and other solids) of milk. Processors in turn process those components into finished dairy products. From there, prices are determined by the market where supply, demand and other factors influence prices. The retail price of dairy products is not regulated in Canada. However, some provinces do regulate the retail price of fluid milk.

²Effective for February 1, 2023, pricing, the Statistics Canada Complete cattle feed index has been replaced by the Complete dairy cattle feed index [1811211]. For YoY comparison, the 2020 iCOP has been recalculated using the Complete dairy cattle feed index. The published result of the 2020 iCOP released in 2021 was \$92.20/std hl.

2021 COP results

The data used in calculating the cost of producing milk in Canada are collected from farms by two independent accounting agencies who then verify and organize the data. The CDC uses this data to calculate the COP.

The first figure calculated is the non-indexed 2021 COP (shown in **Table 2**). This figure is expressed in standardized hectolitres.

Table 2. 2021 non-indexed COP

COP (\$/std hl)	
2021 non-indexed COP	\$84.57

2021 Sample

A total of 238 farms across the country were sampled for data collection during the 2021 calendar year. Of those, 230 farms were used for the final calculation (8 exclusions). National production share of the sample is shown in **Table 3**. Any discrepancies between the sample share of production and the national production share are adjusted in the COP calculation.

More information on the COP sampling methodology can be [found here](#).

Table 3. Farm sample used in the COP survey

	Maritimes	Quebec	Ontario	West	Canada
Farms sampled					238
Excluded farms					8
Number of farms selected	14	103	66	47	230
National production share of sample 2021	5.4%	36.1%	33.9%	24.6%	100.00%
Butterfat content of milk (kg/hl)	4.29	4.18	4.06	4.30	4.18
Solids non fat content of milk (kg/hl)	9.01	9.09	8.87	9.15	9.03

Table 4 below shows the distribution of the COP sample in terms of their housing system, milking system, business type, and income tax filing type. The final column demonstrates the change in the proportion of the full sample from 2020 to 2021 that each category makes up. The 2021 sample distribution compared to 2020 showed a move away from tie stall to other housing systems despite it still being the majority among the sample. Meanwhile, for the milking system, automatic milking and parlour has gone down by 3%. Finally, within the sample, a majority of the farms reported themselves as standard businesses. There was a small decrease in the number of farms who report as organic.

Table 4. Attributes of farms in the COP sample

System	Type	Number	Change 2021 vs 2020
Housing System	Tie Stall	119	1.8%
	Free Stall	86	-0.5%
	Loose Housing	33	-0.4%
	Other	0	-0.9%
Milking System	Manual	0	0.0%
	Automatic milking and pipeline	117	0.9%
	Automatic milking and parlour	66	-3.1%
	Robotic milking	51	1.3%
	Other	4	0.8%
Business Type	Standard	230	0.7%
	Organic	6	-1.1%
	DHA	2	0.4%
	Other	0	0.0%
Income Tax Filing Type	Sole proprietor	38	-0.6%
	Partnership	79	-0.3%
	Incorporated	106	-0.1%
	Other (Colony)	15	0.9%

The information shown in **Table 4** represents the COP sample only. For select farm statistics for all farms in Canada, visit the [CDIC website](#).

Standardization

The COP data is provided to the CDC based on the actual composition of milk. The use of a standard milk composition allows for year-over-year comparisons. Actual figures are converted to standardized figures at the end of the process using the most recent component standards included in **Table 5**.

Table 5. Standards used in the 2021 COP calculations

	Butterfat	Solids non fat
Allocation of COP ³	43%	57%
Milk standard composition	3.6 kg/hl	8.9177 kg/hl
Sample milk composition ⁴	4.176 kg/hl	9.026 kg/hl

As an example of the standardization calculation using the data in **Table 5**, we can calculate the cost needed to produce a standard hl of milk. Starting with \$1.25/hl:

$$\begin{aligned}
 & \$1.25/hl \times \left(\left(43\% \times \frac{3.6}{4.176} \right) + \left(57\% \times \frac{8.9177}{9.026} \right) \right) \\
 & = \$1.17/std\ hl
 \end{aligned}$$

Margin of error

The COP survey uses a random sampling of farms throughout the country with specific targets for regions and farm sizes. Because the COP results are based on a sample, and not the full population of dairy farms in the country, it is expected that there will be a slight difference between the population level COP and the sample-based COP.

The margin of error is a statistical indicator. It indicates that 19 times out of 20, a different random sample of farms would be within the defined range. The margin of error for the 2021 COP was \$1.87/hl, or 2.06%.

³The allocation between butterfat and solids non fat (SNF) is determined by the rolling three-year average butterfat portion of total revenues and SNF portion of total revenues, which together equal 100% of revenues.

⁴Weighted average composition of all eligible farms.

Table 6. Margin of Error for 2021 COP sample

2021 sample	%	\$
Margin of Error	2.06%	\$1.87/hl

COP highlights (\$/std hl)

The unindexed cost of production for one standard hectolitre of milk in 2021 was **\$84.57/std hl**. This represents a decrease of 1% compared to the unindexed 2020 cost of production.

In 2021, COVID-19 shutdowns continued to cause market disruptions. In the latter half of 2021, cost increases were seen in various industries due to supply chain issues, changes in demand, and labour shortages.

The \$0.85/hl decrease in the unindexed COP in 2021 is mainly due to decreases in capital costs (-\$0.54/hl) and producer labour costs (-\$0.91/hl). An increase of \$0.55/hl in cash costs was offset by the other decreases.

Table 7. 2021 COP Costs* compared to 2020

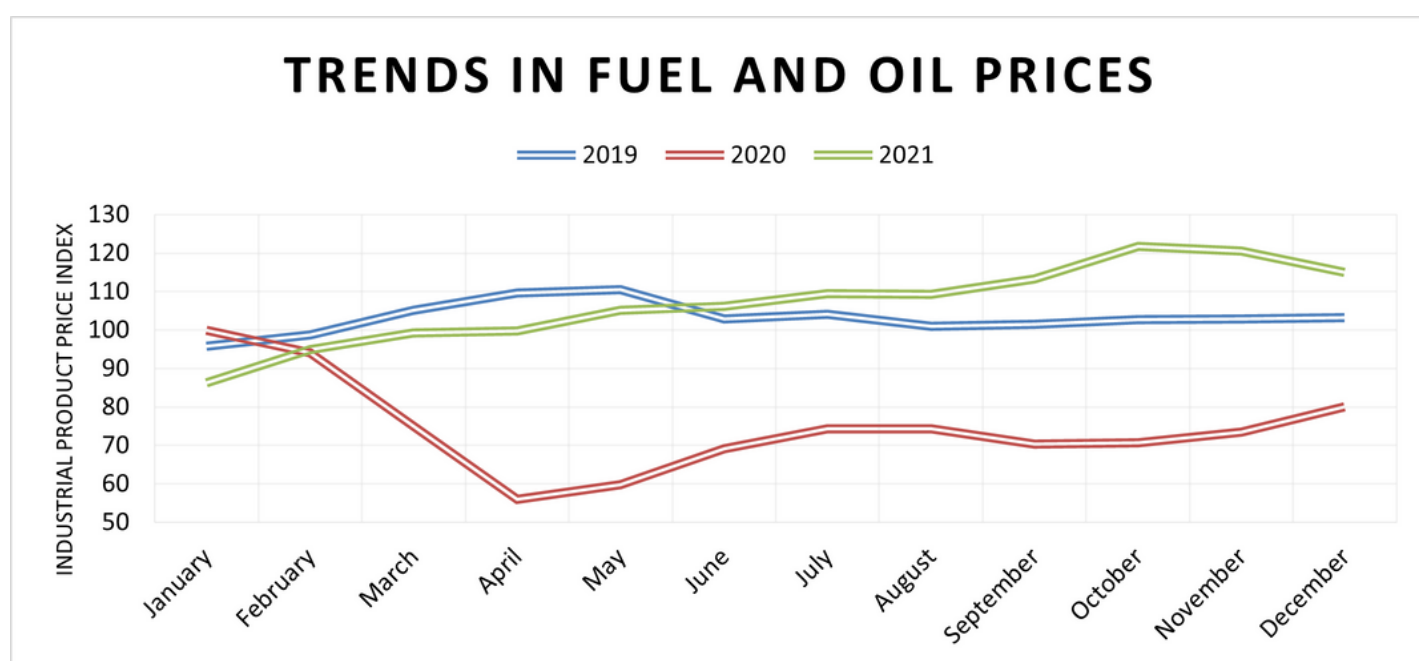
	2020 COP \$/std hl	2021 COP \$/std hl	\$/std hl change	% change
Cash costs	49.45	50.01	+0.55	+1.1%
Capital costs	16.32	15.77	-0.54	-3.3%
Producer labour costs	20.22	19.31	-0.91	-4.5%
Government rebates and other	-0.57	-0.52	+0.05	-9.5%
Total COP	85.42	84.57	-0.85	-1%

*The results shown in **Table 7** are the result of the survey, **non-indexed**, in \$/standard hectolitre. Non-indexed results **must be indexed** before they can be used for pricing.

Among the cash costs presented in **Table 7**, feed costs increased modestly in 2021 from 2020, but not as much as they did between 2019 and 2020. Feed costs increased by \$0.76/std hl, or 3.8%, compared to 2020, however Statistics Canada indices show costs increased by 22%, indicating efficiency gains on Canadian farms.

Fuel and oil prices in 2021 were \$1.83/std hl, up from \$1.54/std hl in 2020. Average retail prices for gasoline in Canada followed a similar trend. In 2020 the average was \$100.88 per litre, whereas in 2021 it was \$132.92⁵ per litre. Rising prices due to supply chain disruptions in 2021 and historically low prices due to the change in demand related to worldwide COVID-19 shutdowns in 2020 explain the rise in prices. 2021 fuel prices were similar to those of 2019.

Figure 1. Trends in fuel and oil prices



Source: <https://www150.statcan.gc.ca/t1/tbl1/en/sbv.action#tables, v1230996147>

⁵ Statistics Canada. Table 18-10-0001-01. Monthly average retail prices for gasoline and fuel oil, by geography.

There was a significant decrease in custom work⁶ in 2021 compared to 2020, going from \$2.96/std hl to \$2.48/std hl. It is likely that farmers needed to have more custom work done in 2020 due to the lower availability of labour. This situation corrected itself in 2021 as labour has become more accessible. Finally, the greater implication of owner and family labour in 2020 may have improved efficiency at the farm level, leading to less need of custom work, even compared to 2019, where custom work was \$2.58/std hl.

Looking at capital costs, interest paid in 2021 decreased from 2020 by 15.6% because interest rates were lower throughout 2021 compared to 2020. The Bank of Canada's average 5-year mortgage rate was 4.79% in 2021, compared to 4.95% in 2020. Lower interest rates, and a decrease to the asset-to-liability ratio contributed to the decreases in cost for return on equity⁷ by \$0.39/std hl. Weighted average total assets decreased by 3.7% while long-term debt and total liabilities within the sample increased by 5.3% and 4.6% respectively in 2021.

Efficiency gains were observed in producer labour in 2021. Costs decreased by -\$0.91/std hl compared to 2020. Though there was an increase in salary and wage rates in 2021 compared to 2020, producer labour costs decreased this year due to a decrease in reported hours/hl for producer and family labour compared to 2020, which was an atypical year that required more producer labour hours to offset staffing challenges. On the other hand, hired labour hours/hl increased in 2021, which has an impact on cash costs.

Table 8. 2021 COP results - Select costs, 2021 compared to 2020

2021 COP	2020 COP \$/std hl	2021 COP \$/std hl	% change 2020/2021	\$/ std hl change 2020/2021
Purchased feed	20.19	20.95	3.8%	0.76
Fuel and oil	1.54	1.83	18.3%	0.28
Custom work	2.96	2.48	-16.4%	-0.49
Interest paid	3.46	2.92	-15.6%	-0.54
Return on equity	4.85	4.47	-8.0%	-0.39
Producer labour	20.22	19.31	-4.5%	-0.91
TOTAL COP	85.42	84.57	-1.0%	-0.85

⁶ Custom Work (beating, ploughing, seeding, drying, manure spreading, etc.)

⁷ The return on equity is considered a cost as it relates to paying the owner for his/her time and risk to invest in and own a dairy farm.

Indexation

The 2021 COP survey is used to calculate milk prices effective February 1st, 2023. To ensure that results from 2021 reflect more recent trends in specific cost variables, the 2021 COP is indexed to reflect today's reality more accurately. The three-month period ending August 2022 is used for pricing calculations for February 1st, 2023⁸.

The following cost elements are indexed to the most recent three months ending August 2022:

- a) Cash costs are indexed using Statistics Canada indices (see Appendix 2).
- b) The interest component is indexed using the Bank of Canada five-year mortgage rate (see Appendix 2).
- c) Producer labour and remaining components of capital costs are not indexed.

Highlights from COP indexation (iCOP) (\$/std hl)

The 2021 iCOP result is **\$94.44/std hl (indexed to August)**.

Indexing the COP to August increased the COP by 11.7%. **Table 9.** shows that when indexing the 2021 survey costs to the most recent 3 months ending in August, the COP increases by \$9.87/std hl.

Table 9. COP indexation

2021 COP - select costs, indexed	2021 COP \$/std hl	2021 iCOP \$/std hl indexed to August	\$/ std hl change July 2022/August 2022
Purchased feed	20.95	25.49	+4.54
Transportation, fees and promotion	5.11	6.58	+1.47
Fuel and oil	1.83	3.03	+1.20
Fertilizer and herbicides	1.75	2.36	+0.61
Interest paid	2.92	3.64	+0.72
All other costs	52.01	53.34	+1.33
RESULT OF COP FORMULA	84.57	94.44	+9.87

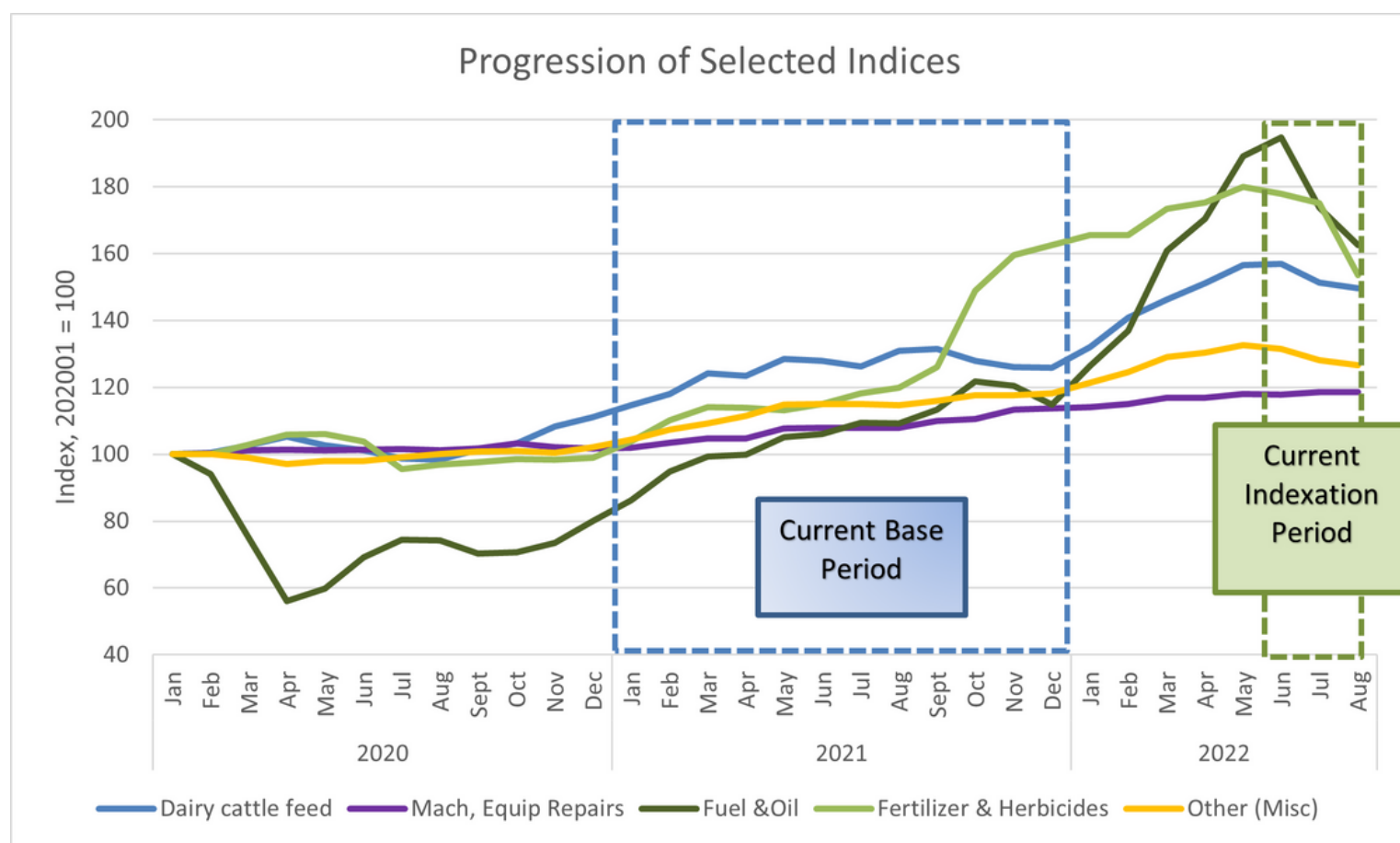
⁸As per industry decision taken in 2019.

Rising feed costs, fertilizer costs, fuel costs, interest rates, and overall CPI in the 3 months ending in August 2022 have contributed to the increase COP, when indexed. Lingered disruptions from COVID-19 supply chain issues, rising inflation, and geopolitical conflicts in Ukraine continue to put upward pressure on input costs, impacting the cost of production.

Figure 2 illustrates the evolution of selected indices since 2020. For the 2021 COP, the base year used for indexation is the 2021 calendar year. COP costs are indexed to the 3 most recent months available at the time of February 1st pricing, i.e., June through to August. Dairy ration increased by 22% compared to the average index during the base period, fuel and oil by 66%, fertilizer and herbicides by 35%, machinery and equipment repairs by 10%, and other (miscellaneous) professional fees, animal costs, and crop costs by 14%. It should be noted that all costs which are indexed in the COP indexed upward in 2022.

Since 2018-2019, the CDC worked with Statistics Canada to develop and publish a new indicator that is specific to feed costs in dairy. Statistics Canada developed a dairy specific indicator and has been publishing data monthly since January 2020. For February 1st, 2023, pricing, and going forward, the Statistics Canada Complete dairy cattle feed index will be used in place of the Complete cattle feed index. For year-over-year comparison, the 2020 iCOP has been recalculated using the Complete dairy cattle feed index. The indexed results are shown in **Appendix 1**.

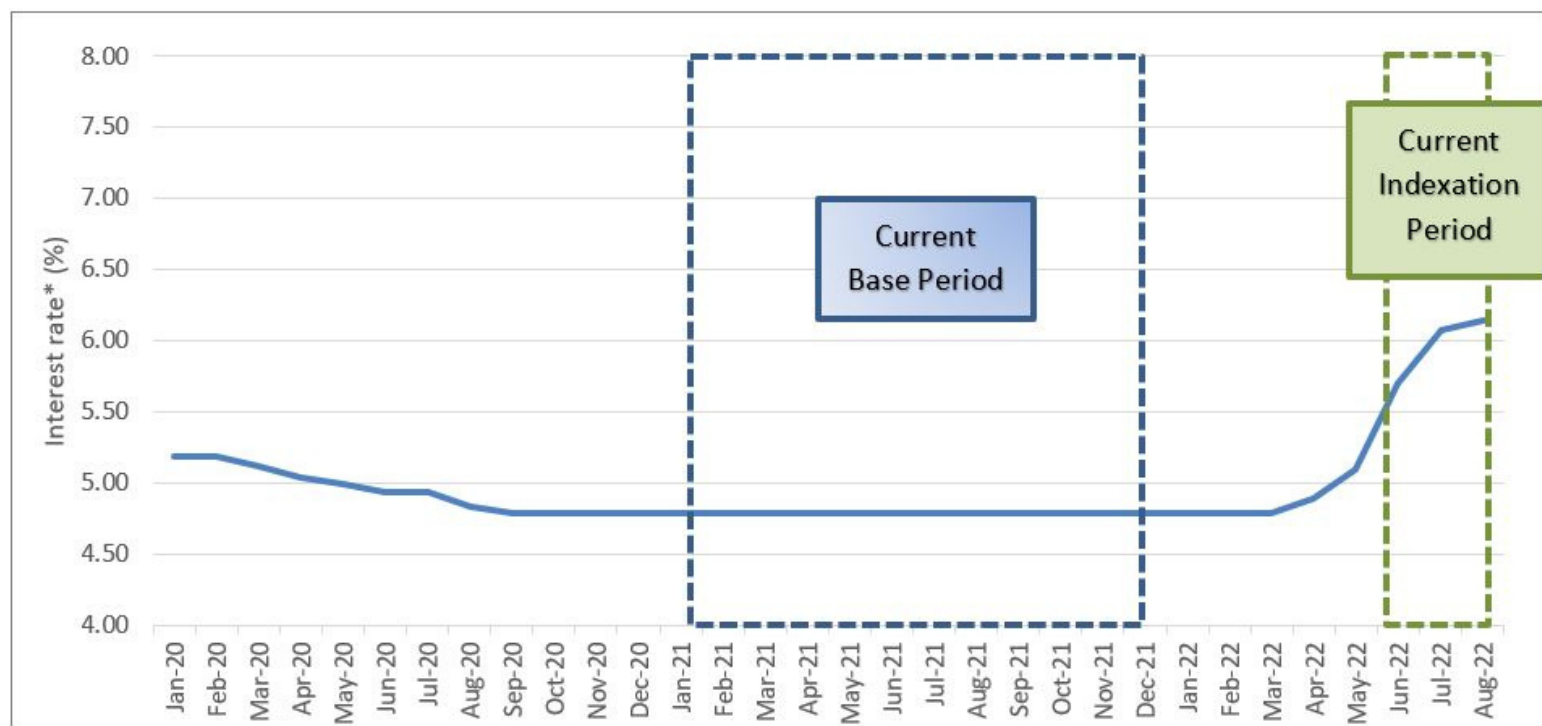
Figure 2. Evolution of selected indices



*Source: Statistics Canada

In **Figure 3**, the monthly average interest rates for a conventional 5-year mortgage in Canada shows the progression of interest rates from the base period of the 2021 calendar year compared to the most recent 3 months available at the time of February 1st pricing, i.e., June through to August. This index is used to index the interest paid under capital costs in the COP. Rates increased by 25% compared to the base period of 2021.

Figure 3. Monthly average interest rates, conventional 5-year mortgage



*Source: Bank of Canada conventional 5-year mortgage rates.

Appendix 1

National Cost of Production Calculation

2021 Results

	2021 COP	2021 COP Indexed to August 2022	2020 COP Indexed to August 2021	% change August 2022/August 2021
CASH COSTS	\$/hl	\$/hl	\$/hl ⁽²⁾	
Purchased feed	20.95	25.49	25.22	1.1%
Artificial insemination*	3.29	3.29	3.29	0.0%
Transportation, fees & promotion	5.11	6.58	5.07	29.9%
Machinery, equipment repairs	3.12	3.42	3.42	-0.1%
Fuel & oil	1.83	3.03	2.24	35.5%
Custom work	2.48	2.67	3.08	-13.0%
Fertilizer & herbicides	1.75	2.36	2.21	6.5%
Seed & plants*	1.17	1.17	1.31	-10.6%
Other (Misc): Professional fees	0.78	0.89	0.88	1.1%
Other (Misc): Animal costs	1.71	1.95	2.02	-3.8%
Other (Misc): Crops costs	0.59	0.66	0.60	11.2%
Land & building repairs	3.11	3.35	3.25	3.0%
Property taxes & insurance	2.44	2.47	2.30	7.1%
Hydro & telephone	1.72	1.76	1.63	7.9%
Hired labour	3.37	3.47	3.64	-4.6%
Purchase/sale of animals*	-3.22	-3.22	-3.34	-3.5%
Dairy Inventory Value adjustment	-0.19	-0.19	-0.31	-39.7%
Total Cash Costs	50.01	59.16	56.52	4.7%
CAPITAL COSTS				
Interest paid	2.92	3.64	3.35	8.6%
Building depreciation*	3.50	3.50	3.28	6.6%
Machinery & equipment depr*	4.89	4.89	4.72	3.6%
Return on equity*	4.47	4.47	4.85	-8.0%
Total Capital Costs	15.77	16.49	16.21	1.8%
PRODUCER LABOUR				
Direct labour*	14.05	14.05	14.75	-4.7%
Return to management* ⁽¹⁾	5.26	5.26	5.48	-4.0%
Total Producer Labour	19.31	19.31	20.22	-4.5%
GOV'T REBATES & OTHERS*	-0.52	-0.52	-0.57	9.5%
RESULT OF COP FORMULA	84.57	94.44	92.38	2.2%

* Not indexed

(1) The rate of \$48.99 per hour was used. It represents the mid-range AG-3 salary in 2021.

(2) Effective for February 1, 2023, pricing, the Statistics Canada Complete cattle feed index has been replaced by the Complete dairy cattle feed index (1811211). For YoY comparison, the 2020 iCOP has been recalculated using the Complete dairy cattle feed index. The published result of the 2020 iCOP released in 2021 was \$92.20/std hl.

Appendix 2

Appendix 1

Description of indices used to update cash costs and interest component

COST COMPONENTS	2021	August 2022	% change August 2022 / 2021
Dairy Ration	125.4	152.6	22%
Transportation, fees & promotion	2.84	3.7	29%
Mach, Equip Repairs	107.8	118.4	10%
Fuel & Oil	106.7	177.0	66%
Custom Work	141.6	152.9	8%
Fertilizer & Herbicides	125.4	168.9	35%
Other (Misc)	113.4	128.8	14%
Land & Building Repairs	145.5	156.5	8%
Property Taxes & Insurance	170.9	172.8	1%
Hydro & Phone	138.4	141.9	3%
Hired Labour	40.3	41.5	3%
Interest	4.8	6.0	25%

Dairy Ration		Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly. Complete dairy cattle feed [1811211]. Index, 202001=100.
Transportation		P5 Transportation Pooling Figures/Chiffres du pooling P5 pour le transport
Mach, Equip Repairs	v1230996240	Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly. Canada; Agricultural, lawn and garden machinery and equipment. Index, 202001=100.
Fuel & Oil	v1230996147	Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly. Canada; Energy and petroleum products. Index, 202001=100.
Custom Work	v41690973	Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted. Canada; All-items. 2002=100.
Fertilizer & Herbicides	v1230996090	Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly. Canada; Fertilizers, pesticides and other chemical products. Index, 202001=100.
Other (Misc)	v1230996007	Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly. Canada; Total, Industrial product price index (IPPI). Index, 202001=100.
Land & Building Repairs	v41691060	Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted. Canada; Homeowners' maintenance and repairs. 2002=100.
Property Taxes & Insurance	v41691058	Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted. Canada; Property taxes and other special charges. 2002=100.
Electricity	v41691063	Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted. Canada; Electricity. 2002=100. The index accounts for 80% in the indexation of the Hydro and Phone.
Telephone	v41691070	Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted. Canada; Telephone services. 2002=100. The index accounts for 20% in the indexation of the Hydro and Phone.
Hired Labour	v1602417	Statistics Canada. Table 14-10-0209-01 Average hourly earnings (including overtime) for salaried employees, by industry, monthly, unadjusted for seasonality. Canada; Industrial aggregate excluding unclassified (Dollars).
Interest		The interest component is indexed using the Bank of Canada 5-year mortgage rate.