



**UNIVERSITY OF
SASKATCHEWAN**

Cost of Production: Understanding Recent Results

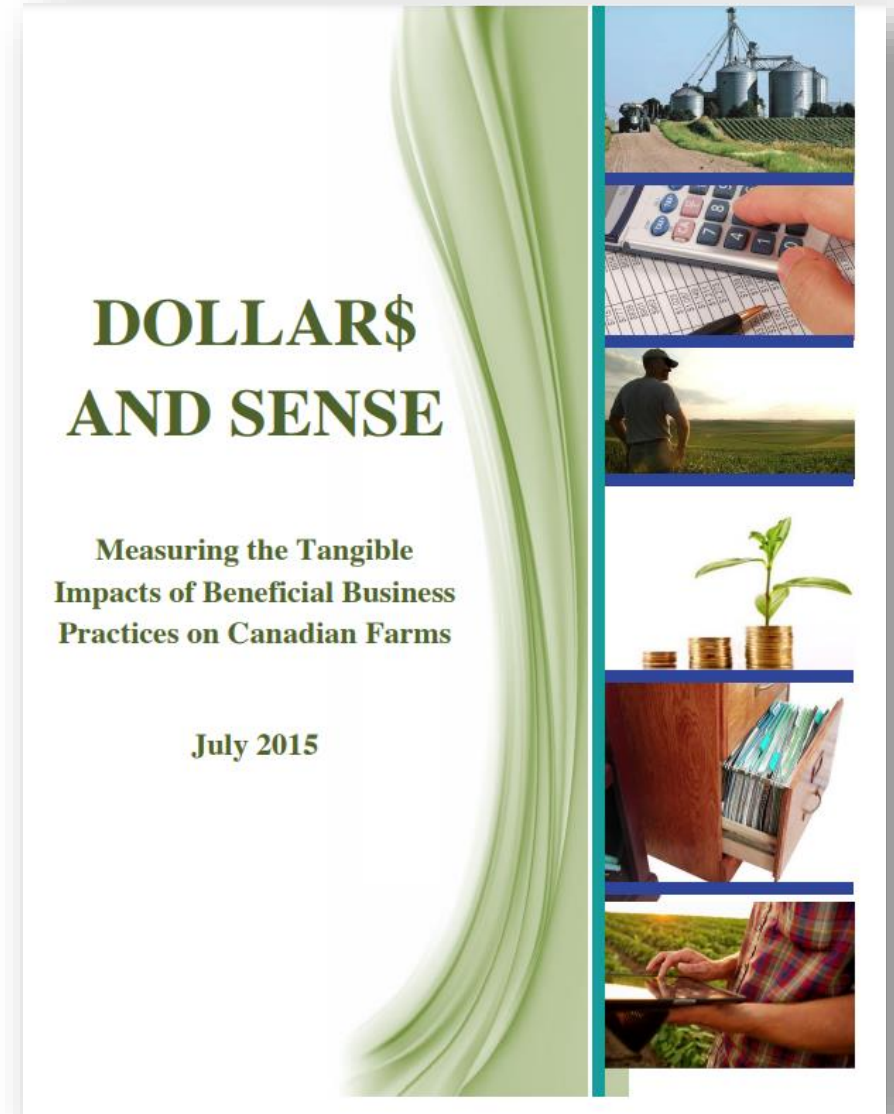
SSGA AGM | Assiniboia, SK | June 7, 2022

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Agricultural and Resource Economics**

7 Business Management Activities of Financially Successful Farms:

1. Continual Learning
2. Accurate Financials to make decisions
3. Use of Advisors
4. Formal Business Plan
5. Cost of Production
6. Risks assessed & managed
7. Financial Planning

Source: <https://fmc-gac.com/dollarssense/>



n=604 Canadian farms from Ipsos database;
including 151 beef farms

How does one calculate COP?

Cost of Production 101

- Calculated by **enterprise** or profit centre
 - Cow-calf operation can have multiple “enterprises” → cow-calf, backgrounders, replacement heifers, hay, pasture
- Based on **economic profit** rather than accounting profit
 - Revenues – expenses = accounting profit
 - Revenues – expenses – **opportunity costs** = economic profit
- **Opportunity costs** → benefits missed out on by using resource in current enterprise rather than next best alternative
 - labour, management, land and equity capital

Cost of Production 101

- **Variable expenses (aka operating, direct expenses)**
 - Only incurred when production happens
 - e.g., feed, mineral, health products, cropping inputs, labour, fuel, repairs
- **Fixed expenses (aka overhead, capital, indirect expenses)**
 - depreciation, term/capital interest, property taxes, non-production insurance
 - often shared across enterprises → allocate on basis of use, revenue
 - **Depreciation** → 10% equipment value, 5% buildings

Production & Financial Details Required

for Cow-Calf Enterprise Analysis

Production Details

- Number of breeding females wintered
- Number of calves weaned & weights
- Winter feedstuff amounts
- Grazing days

Additional measures:

- Conception rate, calf death loss, cow weight, calving distribution, cow:bull ratio, culling rate, etc

Financial Details

- Cull Sales
- Calf Sales & Market value of retained calves
- Breeding stock purchases & Market value OR cost to raise replacements
- Purchased feed/bedding, mineral/salt & rented pasture
- Market value OR cost to produce homegrown feed, bedding & grazing
- Vet services, supplies, tags, implants
- Hauling, commissions, check-off, insurance
- Fuel, repairs, utilities, custom work, advisors
- Market value of assets → Depreciation
- Unpaid & paid labour
- Loans → interest, principal commitments

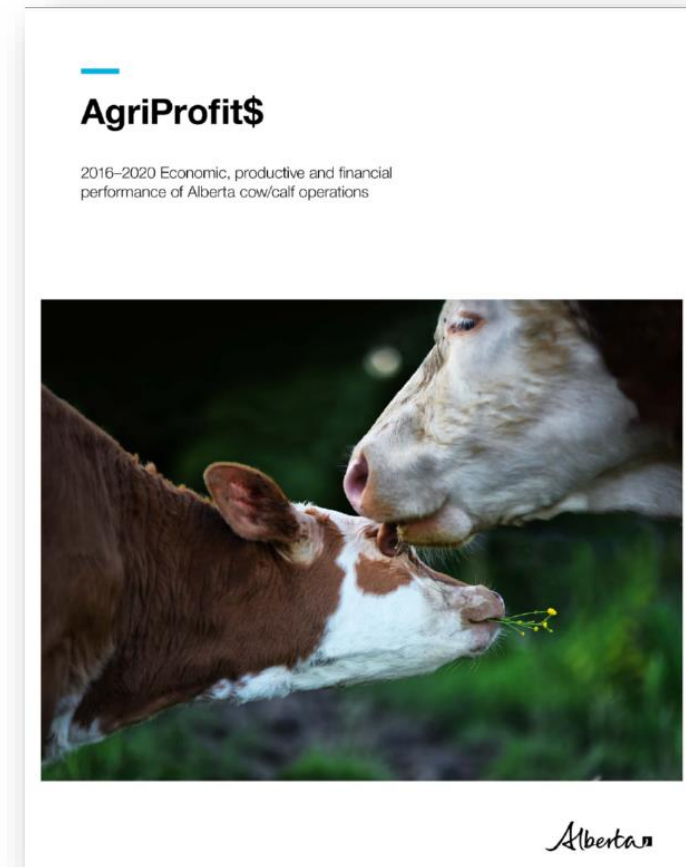
Cow-Calf COP Analysis

- Programs used to manipulate the data and calculate COP
 - AgriProfit\$
 - CowProfit\$
 - Ranching for Profit
 - **agri benchmark**
- Cost of production typically reported as:
 - \$ per cow wintered
 - \$ per lb of calf weaned → Unit Cost of Production (UCOP)



2020 Alberta Cow-Calf COP

- \$994 per cow wintered
- \$1.86 per lb of calf weaned
- Conception rate: 85%
- Wean rate: 97%
- Avg herd size: 182 cows
- Mature cow wt: 1328 lb
- Lb weaned/exposed: 456
- Avg farm size: 3,775 ac



Source: <https://open.alberta.ca/publications/agriprofit-economic-production-and-financial-performance-of-alberta-cow-calf-operations>

A typological characterization of Canadian beef cattle farms based on a producer survey

Aklilu W. Alemu, Brian D. Amiro, Shabtai Bittman, Douglas MacDonald, and Kim H. Ominski

- 2011 survey (n=1005) → cluster analysis → 8 farm types

Cluster 1 (n=372)	Cluster 7 (n=223)	Cluster 6 (n=185)	Cluster 5 (n=21)
<ul style="list-style-type: none"> Small, PT, cow-calf Most common in eastern Canada 56 cows 3 quarters of land 43% off-farm income Mid-March calving most calves sold after weaning 	<ul style="list-style-type: none"> Crop-beef mixed Most common on Prairies 77 cows 12 quarters 15% off-farm income March/April calving 2/3 sold calves at weaning 	<ul style="list-style-type: none"> Large, cow-calf, bkgrdr Most common in western Canada 186 cows 11.5 quarters 23% off-farm income April/May calving Background calves 	<ul style="list-style-type: none"> Extensive cow-calf, bkgrdr AB, SK & BC 583 cows 54 quarters 11% off-farm income April/May calving 60% background 160 d

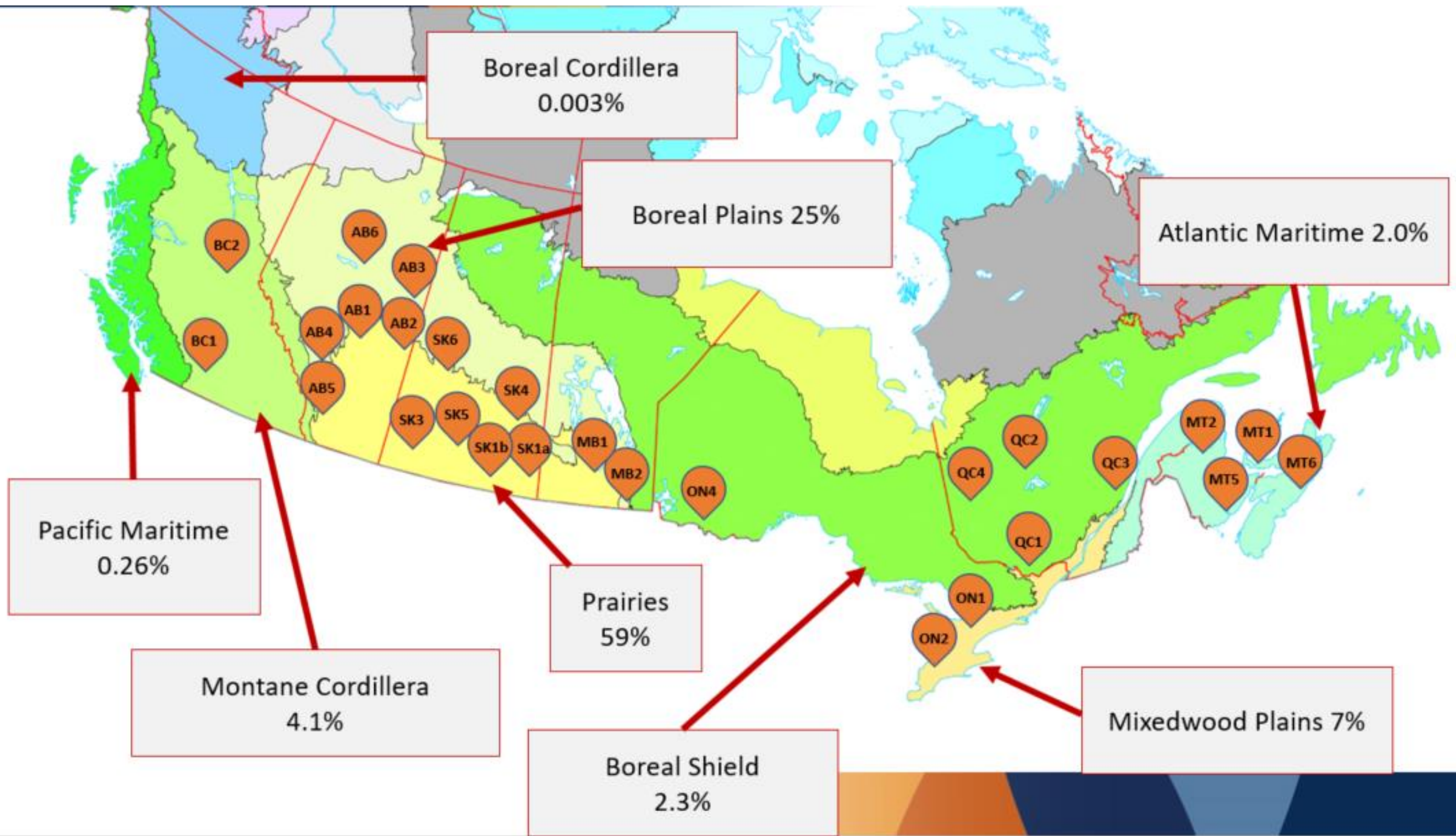
Canadian COP Network

- First pan-Canadian COP effort for cow-calf producers
- Follows agribenchmark methodology
- Data collected every 5 years
- Farms grouped into similar types → ‘Typical Farm’ benchmark
- 115 operations → 25 benchmarks in 2021
- Instead of 1 benchmark per province → 1 benchmark per production system
- Does not provide individual COP analysis
- Results at canfax.ca/COPNetwork.aspx



Typical Farm – 3 to 6 producers

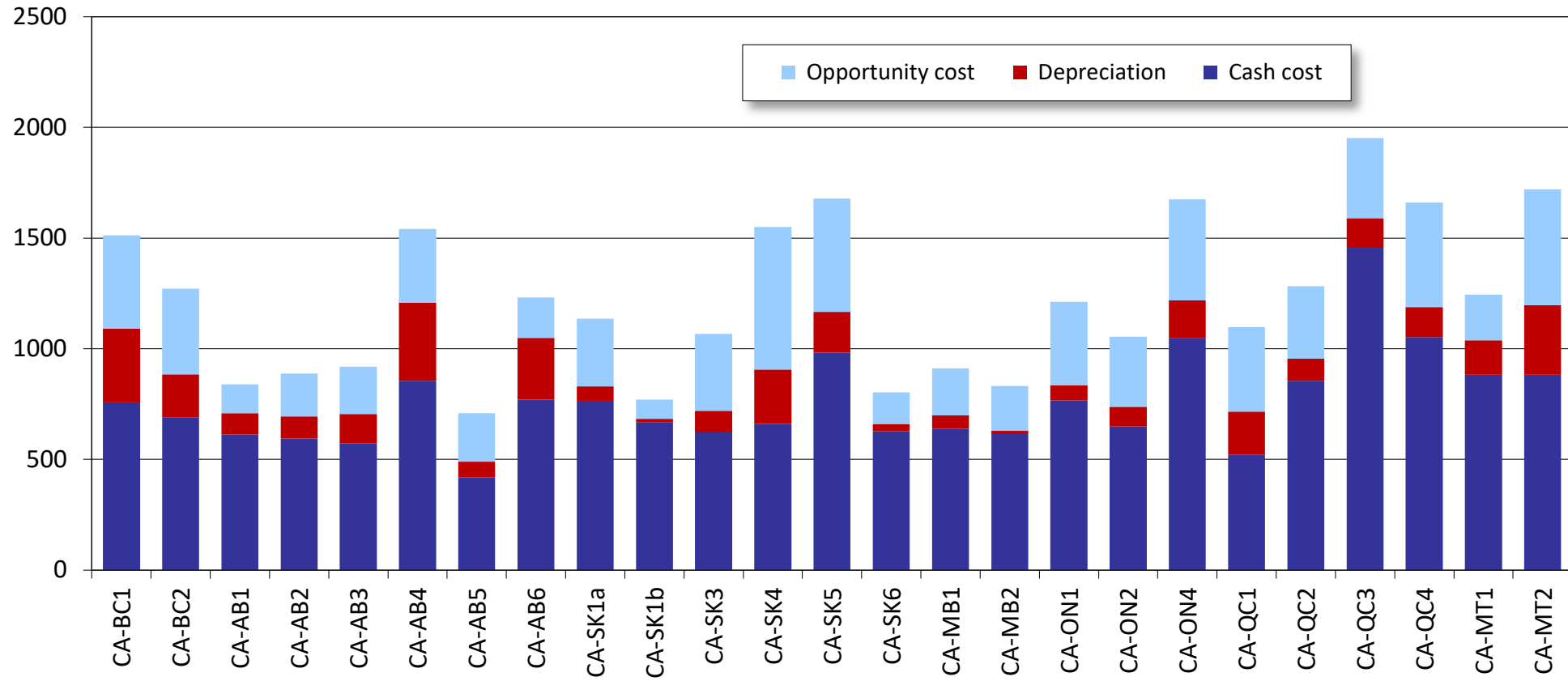
1. Winter Feed Type & Delivery method
2. Calving Date (early vs. late)
3. Weaning date (age at weaning)
4. Retained ownership
5. Herd size
6. Location (ecoregion)



Total COP: \$1148/cow (all farms 16-20)

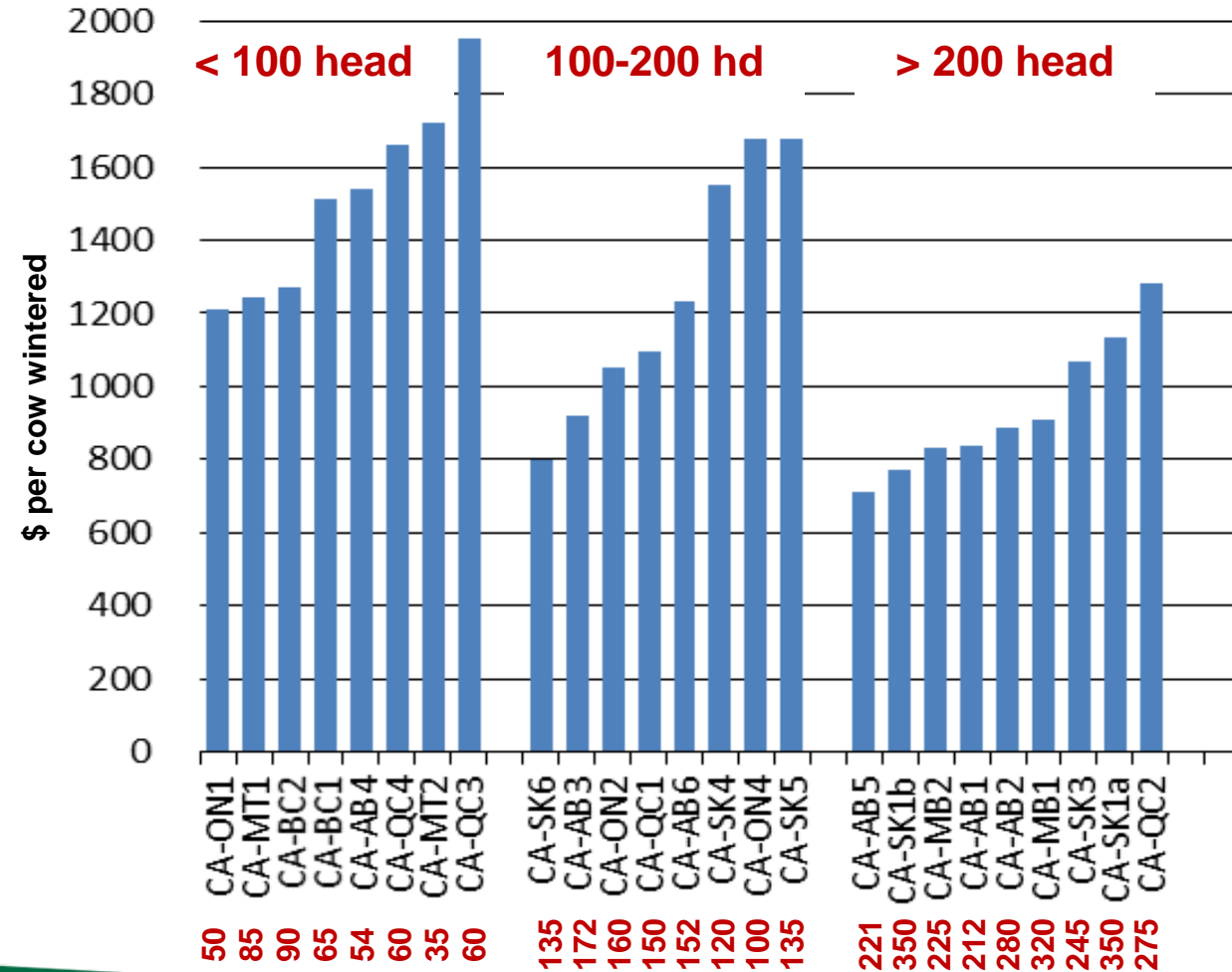
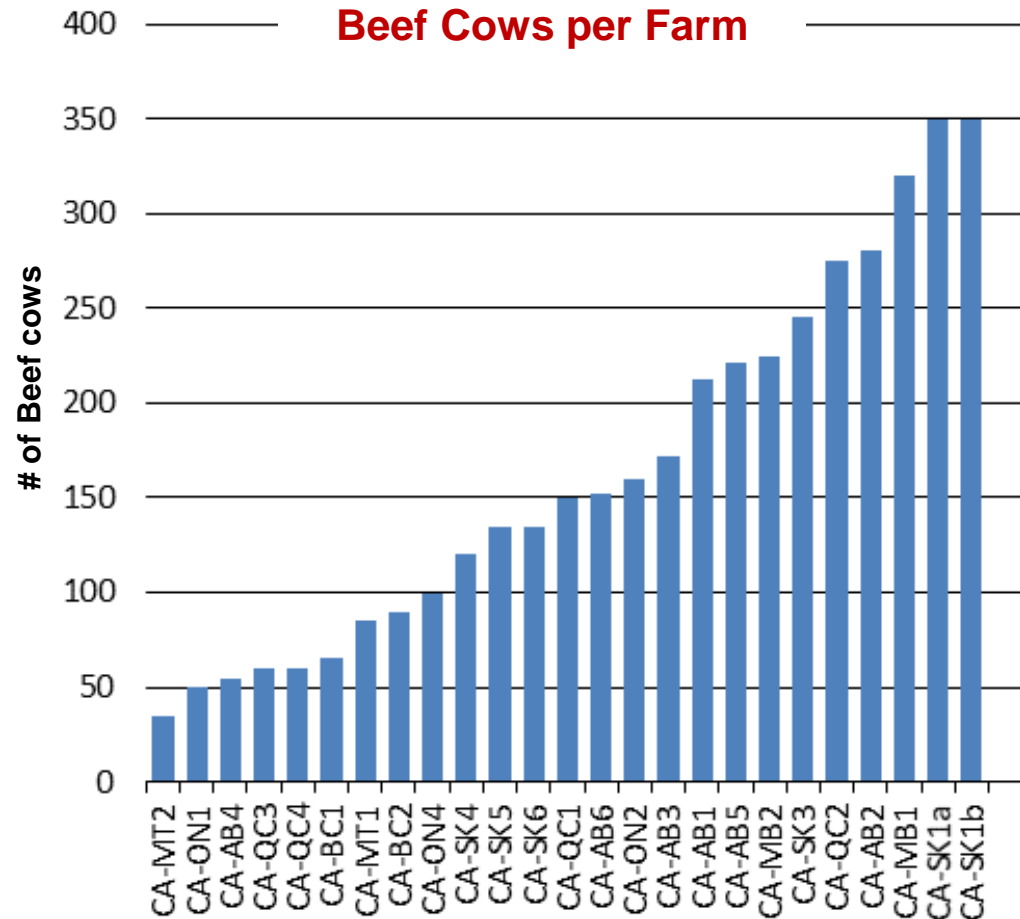
63% cash, 11% depreciation, 26% opportunity

\$ CDN per cow



84% of the typical farms across Canada covered cash costs, but only 25% covered economic costs

Total Costs per Cow by Herd Size



50 85 90 65 54 60 35 60 135 172 160 150 152 120 100 135 221 350 225 212 280 320 245 350 275

Saskatchewan Farms (2016-2020 Avg)



SK-1a - \$1062/cow

- 350 head
- May calving
- December weaning
- **Yearling grassers and bred heifers 254 days on feed**
- **Barley/oat swath graze**, corn graze, and Hay
- 222 d on winter feed on pasture
- 12% purchased feed
- Medium
- Grey soil zone
- 3500 ac



SK-1b - \$770/cow

- 350 head
- May calving
- December weaning
- **Yearling grassers 285 days on feed**
- Hay
- 150 d on winter feed on pasture
- **100% purchased feed**
- Medium
- Dark Brown soil zone
- 3785 ac



SK-3 - \$1048/cow

- 245 head
- Late March calving
- October weaning
- Replacement enterprise
- Hay, **cereal residue and lentil, barley or malt pellets**
- 150 d on winter feed **only confined for calving**
- 18% purchased feed
- Medium
- Brown soil zone
- 8700 ac



SK-4 - \$1453/cow

- 120 head
- March calving
- Late October weaning
- Replacement enterprise
- **Bale grazing**, corn grazing, and **greenfeed**
- 165 d on winter feed **partly confined**
- 5% purchased feed
- **Start-up**
- Black soil zone
- 1429 ac



SK-5 - \$1809/cow

- 135 head
- Late April calving
- November weaning
- Replacement enterprise
- **Stubble aftermath grazing**, cereal silage, hay, **straw and chaff**, cereal screenings, and **camelina meal**
- 160 d on winter feed with **repl. heifers confined**
- 30% Purch. feed
- Start-up
- Brown soil zone
- 2200 ac



SK-6 - \$810/cow

- 135 head
- **February calving**
- October weaning
- Replacement enterprise
- Cash crops
- Cereal silage, hay, TMR, barley grain
- 186 d on winter feed **confined**
- **100% Home grown feed**
- Medium
- Black soil zone
- 3500 ac

Saskatchewan Typical Farms 2020


Farm Name	SK-1a	SK-1b	SK-3	SK-4	SK-5	SK-6
# of Head	350	350	245	120	135	135
Environment						
AU days per acre	33	33	7.8	30.48	18	28
Fertilize Hay (Y/N)	No	No	No	Yes	Yes	Yes
Fertilize Pasture (Y/N)	No	No	No	No	No	No
Hay Yield (tonne/ac)	1.5	N/A	1.2	1.8	1.25	1.77
Grassland acres	2,830	3,785	8,167	1,239	1,995	1,250
Crop acres	683	0	556	190	198	2,268
Physical Performance Indicators						
Breed	Angus-Hereford	Angus-Hereford cross	Angus	Angus cross, Simmental	Angus, Simmental, Charolais	Angus, Simmental, Charolais
Cow:Bull Ratio	23:1	23:1	27:1	25:1	24:1	24:1
Bull Culling Rate	9%	9%	17%	20%	20%	20%
Mature Cow Wt (lb)	1200	1200	1300	1500	1300	1480
Hfr Retention Rate	19.0%	18.6%	13.1%	9.2%	14.8%	14.8%
Cow Death Loss	1.0%	1.0%	1.3%	1.0%	1.3%	1.3%
Cow Culling Rate	17.5%	17.5%	12.0%	8.0%	13.5%	13.5%
Calves Alive After 24H/100 Exposed	88%	88%	92%	96%	92%	92%
Calf Death Loss 24H to Wean	8%	3%	3%	4%	3%	3%
Total Live wt sold / cow	681	551	589	632	680	730
Weaning Weight (lb)	465	487	558	598	611	708
205 d Adj. WW	489	512	621	601	699	636
ADG Pre-weaning	1.95	2.06	2.6	2.5	2.9	2.7
WW as % of Cow Wt	39%	41%	43%	40%	47%	48%
Production System						
Herd Size	350	350	245	120	135	135
Field Feeding days	180	0	30	60	60	0
Supplemented on pasture, days	0	0	0	60	0	0
Full Feed, days	42	150	150	45	100	186
Calving Date	May 02	May 02	Mar 25	Mar 15	Apr 20	Feb 05
Weaning Date	Dec 03	Dec 03	Oct 15	Oct 25	Nov 05	Oct 05
Sale Date	Aug 14	Sep 15	Oct 20	Oct 25	Nov 05	Oct 15
Retained Ownership	Yearling grassers and bred heifers	Yearling grassers	Replacements	Replacements	Replacements	Replacements
% of Feed Purchased	12%	100%	11%	5%	30%	1%
% of Land in Annual Crops	19%	0%	6%	13%	9%	64%
Retained Head Sales (# hd)	236	231	N/A	N/A	N/A	N/A
Placement Weight, lb	475	488	N/A	N/A	N/A	N/A
Sale Weight, lb	835	862-870	N/A	N/A	N/A	N/A
Days on Feed	254	285	N/A	N/A	N/A	N/A
Operation Overview						
Operation Maturity	Medium	Medium	Medium	Start-up	Start-up	Medium
Herd Size	350	350	245	120	135	135
Paid Labour (hours)	-	161	-	-	1,802	560
Unpaid Labour (hours)	5,135	1,691	2,712	2,827	1,529	580
Avg. Wage for Unpaid (\$/hr)	23.67	22.08	23.33	25.00	23.03	19.31

What are the largest costs?

Cow-Calf Cost of Production

VARIABLE COSTS

Animal purchases

Feed (purchase feed, fertiliser, seed, pesticides)

Machinery (maintenance, depreciation, contractor)

Fuel, energy, lubricants, water

Vet & medicine

Other inputs cow calf enterprise

Labour

 Paid Labour

 Unpaid Labour

Total Variable Costs

CAPITAL COSTS

Insurance, taxes

Buildings (maintenance, depreciation)

Land Cost

 Rented Land

 Own Land

Capital Costs

 Liabilities

 Own capital

Total Capital Costs

COSTS

Cash Costs

Depreciation Costs

Opportunity Costs

Total Production Costs

Cow-Calf Cost of Production

VARIABLE COSTS

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Total Variable Costs

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Total Capital Costs

COSTS

Cash Costs

Depreciation Costs

Opportunity Costs

Total Production Costs

CDN COP Network – Opportunity Costs

- **Labour**

- family working hours x wage for qualified local labour

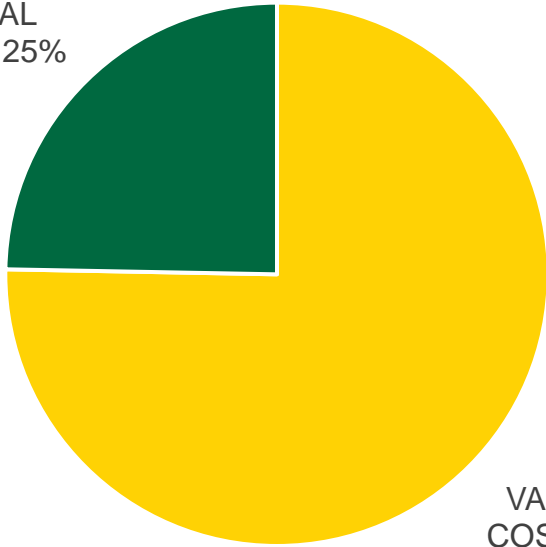
- **Land**

- own land x regional cash rental rate

- **Capital**

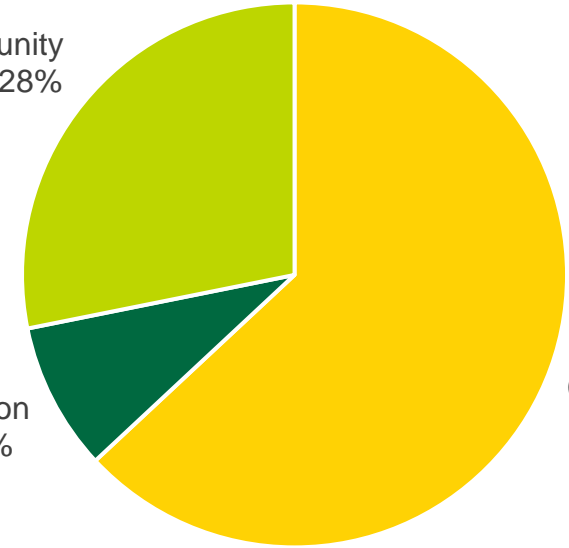
- non-land equity x long-term government bond rate

CAPITAL
COSTS, 25%



VARIABLE
COSTS, 75%

Opportunity
Costs, 28%

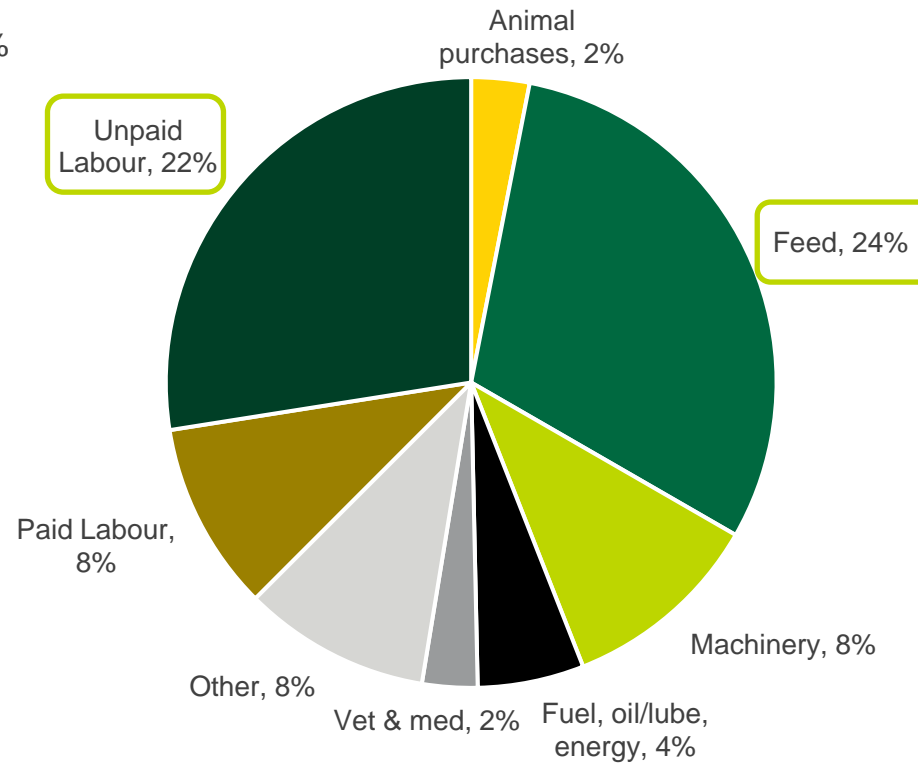


Depreciation
Costs, 9%

Cash Costs,
63%

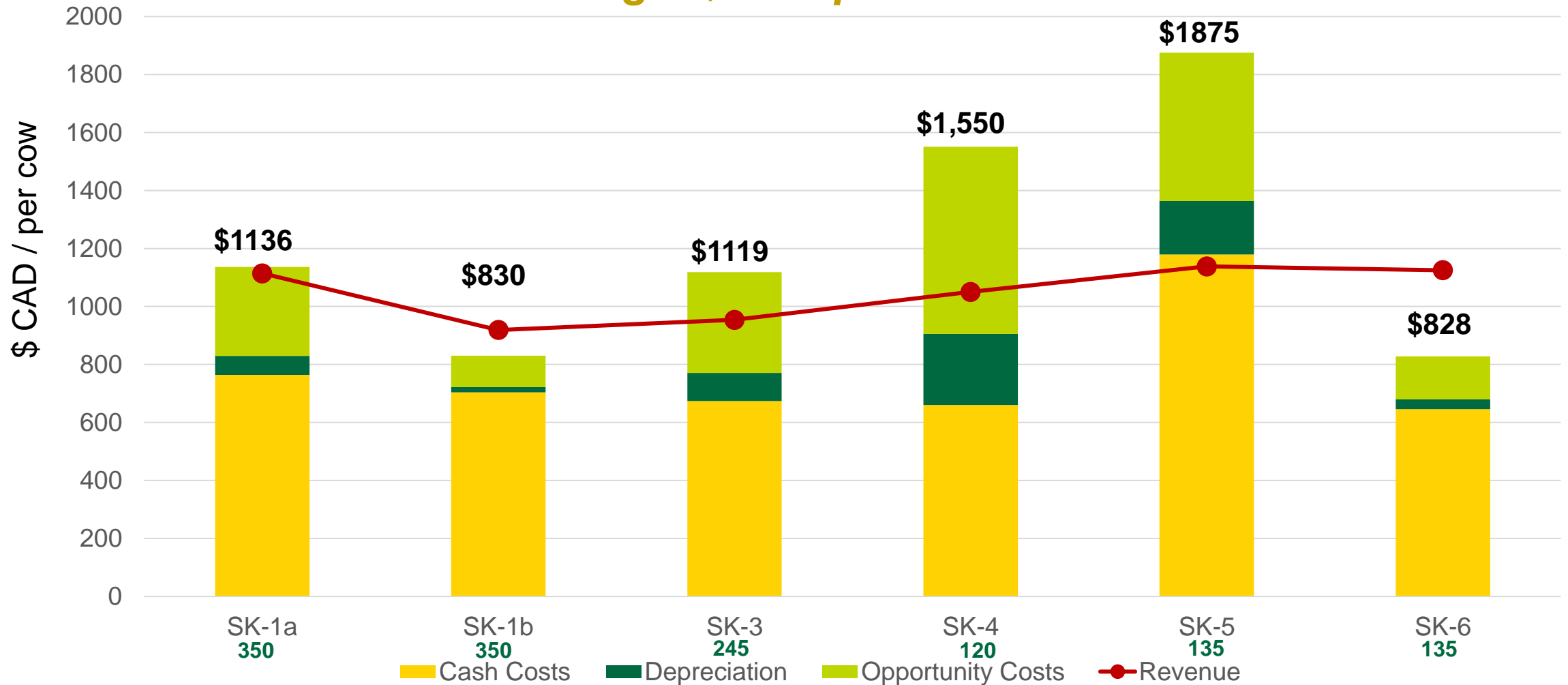
2020 Saskatchewan Typical Farm Benchmarks

AGGREGATED VALUES



SK Typical Farm Benchmarks, 2020

Average: \$1245 per cow wintered



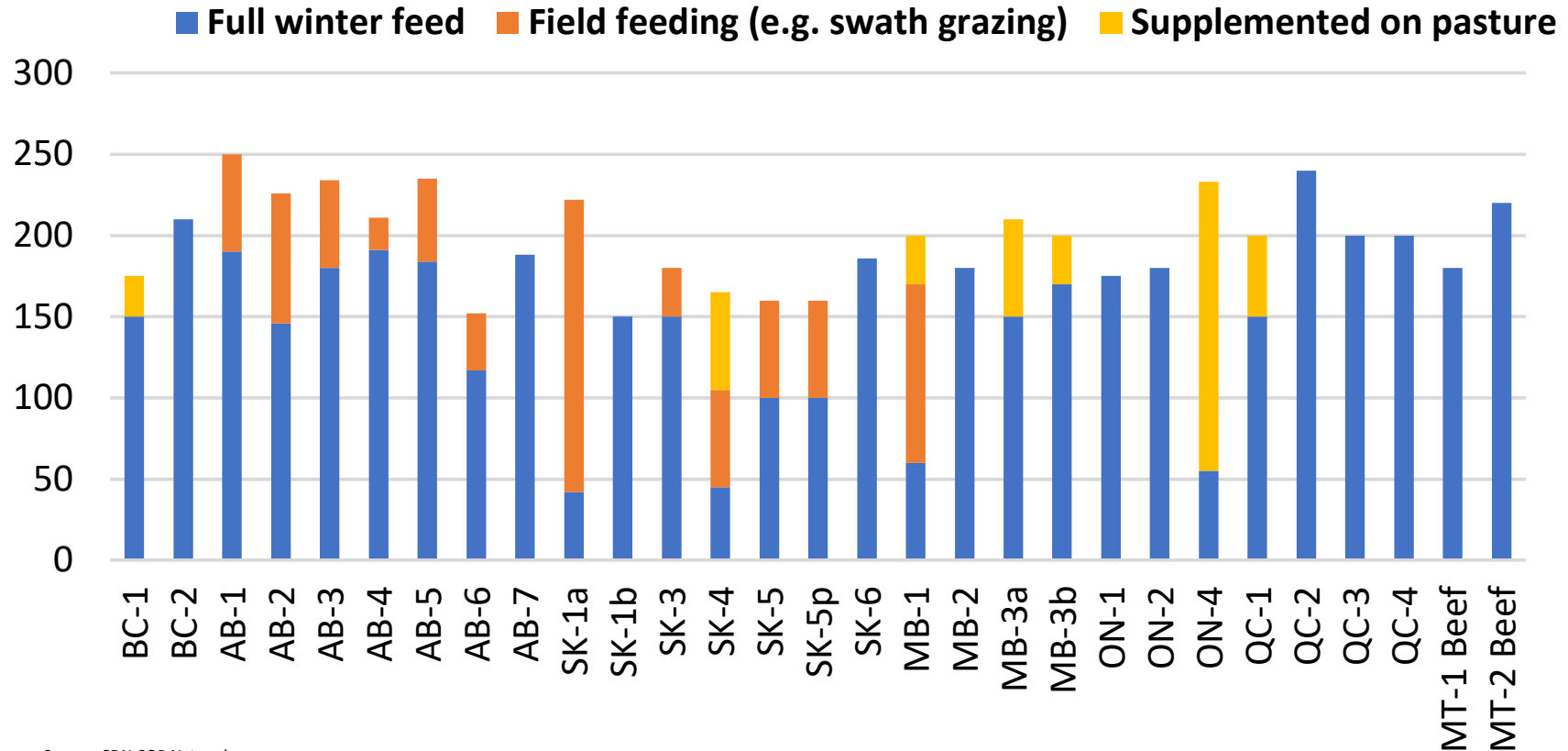
2020 Cow-Calf Cost of Production (\$ / Cow Wintered)

	SK-1a	SK-1b	SK-3	SK-4	SK-5	SK-6
Cows Wintered	350	350	245	120	135	135
Average male and female calf price (\$/head)	1,046	1,092	1,087	1,132	1,276	1,319
REVENUE	\$	\$	\$	\$	\$	\$
Cow Calf						
Cull animals and slaughter receipts	171	177	126	87	248	178
Breeding livestock receipts	372	-	-	-	-	-
Calf Sales and transfer to retained ownership enterprise	570	742	828	963	889	947
Government payments	-	-	-	-	-	-
Other returns	-	-	-	-	-	-
Total Cow-Calf Revenue	1,114	919	954	1,050	1,138	1,125
VARIABLE COSTS	\$	\$	\$	\$	\$	\$
Animal purchases	12.6	12.6	35.5	45.8	35.1	35.1
Feed (purchase feed, fertilizer, seed, pesticides)	346.1	484.7	163.1	275.5	242.4	225.8
Machinery (maintenance, depreciation, contractor)	113.8	31.7	133.2	185.9	103.4	46.8
Fuel, energy, lubricants, water	33.4	10.4	60.4	30.7	117.3	71.4
Vet & medicine	27.0	27.0	25.7	28.0	30.3	30.3
Other inputs cow calf enterprise	77.5	18.1	70.6	71.6	210.3	121.2
Labour						
Paid Labour	-	3.9	-	-	247.8	35.8
Unpaid Labour	226.6	62.1	258.2	596.4	311.4	124.8
Total Variable Costs	837.0	650.5	746.7	1,233.9	1,298.0	691.2
CAPITAL COSTS	\$	\$	\$	\$	\$	\$
Insurance, taxes	32.5	20.0	81.6	67.4	58.5	46.2
Buildings (maintenance, depreciation)	41.8	13.9	89.7	135.7	108.3	20.1
Land Cost						
Rented Land	114.8	98.0	40.7	63.6	54.6	45.4
Own Land	44.1	45.6	75.5	48.8	199.9	23.2
Capital Costs						
Liabilities	30.3	2.1	70.8	1.2	155.7	2.1
Own capital	35.8	0.0	13.7	0.0	0.0	0.0
Total Capital Costs	299.2	179.6	372.0	316.6	577.0	137.0
COSTS	\$	\$	\$	\$	\$	\$
Cash Costs	764.2	704.1	673.7	660.2	1,178.9	646.2
Depreciation Costs	65.6	18.3	97.6	245.1	184.6	34.0
Opportunity Costs	306.4	107.7	347.4	645.2	511.4	148.0
Total Production Costs	1136.2	830.1	1118.7	1550.5	1874.9	828.2
PROFITS	\$	\$	\$	\$	\$	\$
Short-term profit (cash costs)	349.5	215.3	280.3	389.7	-41.2	478.9
Medium-term profit (cash + depreciation)	283.8	197.0	182.7	144.6	-225.8	444.9
Long-term profit (cash + depreciation + opportunity)	-22.6	89.3	-164.7	-500.5	-737.2	296.9

Typical Farm Winter Feeding Days

Average: 200 days; Range: 150-250 days

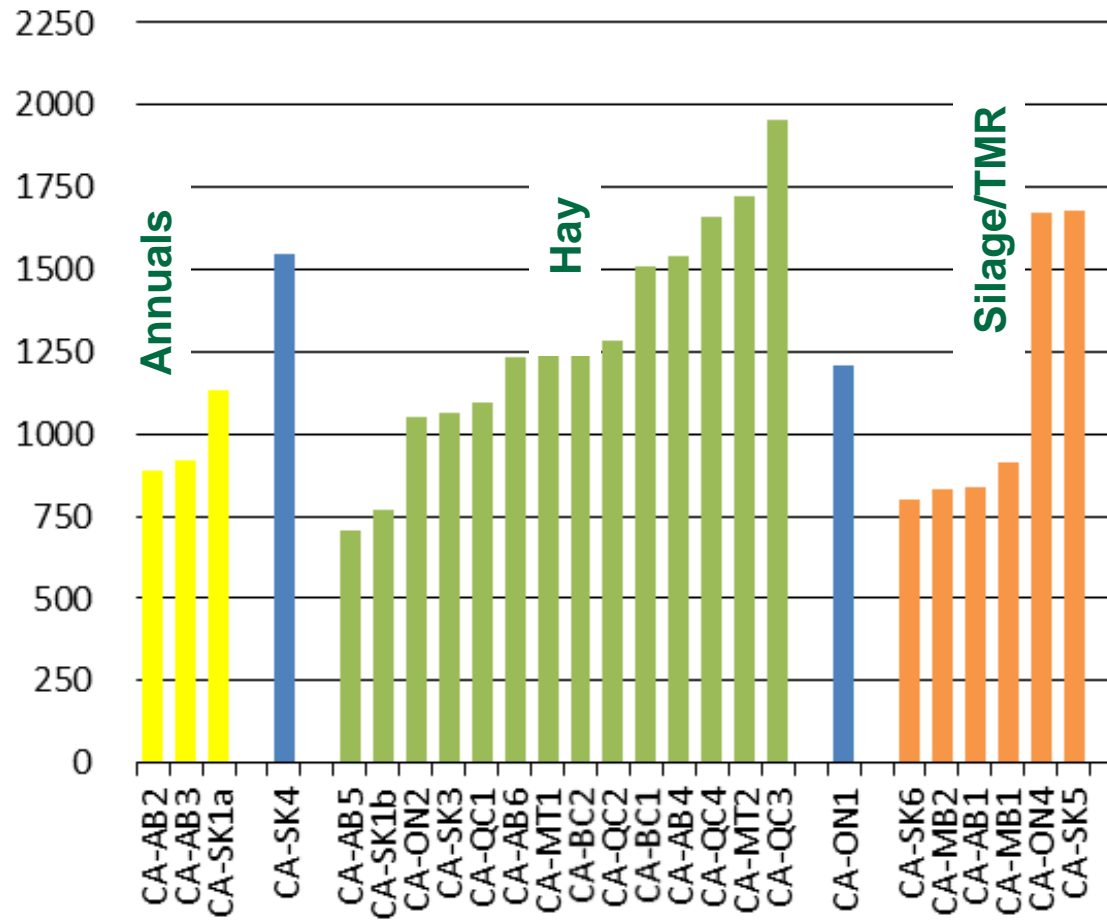
Winter Feeding Days



Total Costs per Cow by Winter Feed

You can be low or high cost with any winter feed stuff

Feed test & develop balanced rations



Unpaid Labour → ~22% of Total Costs

- Producers asked to provide how many hours they (and family members) worked on farm each year
 - Ranged from 1500 to 5000 hours
- Typical full-time hours → $40 \text{ hr/week} \times 52 \text{ wk/yr} = 2080 \text{ hr/person}$
- Value of unpaid labour (opportunity cost) ranged from \$20-25/hr
 - SK Typical Farms Avg \$263/cow wintered; Range: \$62 to \$600

Animal Purchases \$13-35/cow/yr*

- Most producers will raise their own replacements
 - ~10-20% of heifer calves retained
- Breeding bulls purchased will depend on:
 - Cow:bull ratio (Range: 23 to 27 cows per bull)
 - Bull culling rate (Range: 9 to 20%)
- Prices paid for bulls ranged from \$3000 to \$8000; Averaged \$5000

*All values shown pertain to producers for the
SK Typical Farms

Revenue Sources

Revenue Sources in Cow-Calf

- Primary revenue source is the sale of weaned calves
 - 85% weaned calf sales (or market value if calves retained)
 - 15% cull breeding stock
- 1 of 6 developed and sold bred heifers (SK-1a)
- 2 of 6 retained calves to background & grass (SK-1a, SK-1b)
- 1 of 6 Typical farms (SK-6) was mixed farm
 - 81% of whole farm revenues came from cash crops

Key Takeaways

- Calculating COP is one of the Top 7 management practices of financially successful farms (Dollars & Sense Study)
- Economic profit of zero → covering cash costs + depreciation + opportunity costs
- Still lots of variation between typical farms → +\$1000/cow difference
- Recommend calculating COP using own 'farm facts'
- COP analysis has not been provided to SK producers since 2012
- Many factors influence cost of production
- Feed (24%) and Labour (30%) are the two largest costs
- Network still looking for participants for 2023 focus groups

Thank you!

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