

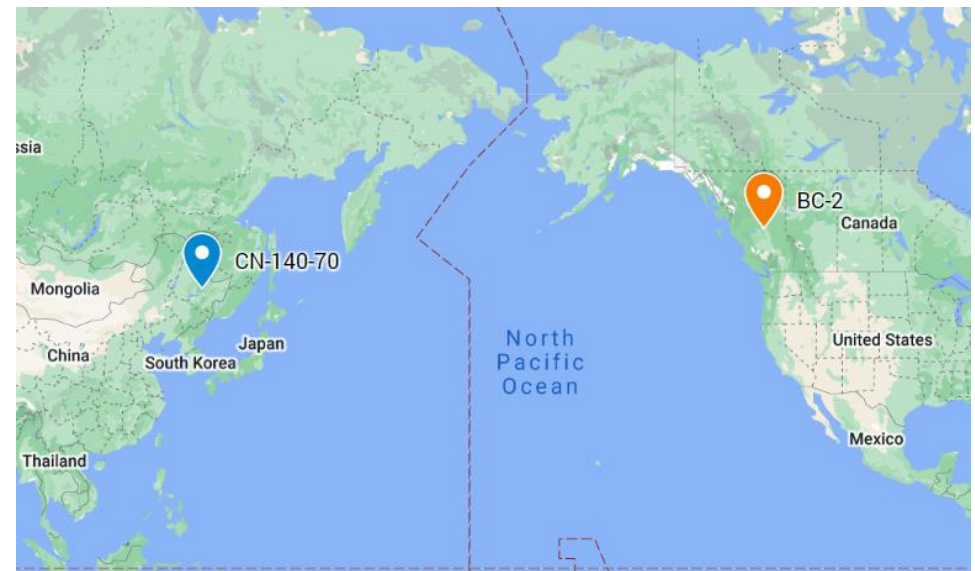


Case Study - BC-2 vs. CN-140-70

Farm Descriptions

BC-2 is a cow-calf operation located in the Central Interior of British Columbia, Canada. This farm has a beef cow herd of 90 head, and keeps Angus, Hereford, Simmental, and Limousin animals. The cow-calf enterprise is located on 1,211 ac of land with clay soils in a semi-arid climate. Mean annual temperature is 4°C, and mean annual precipitation is 650mm, with the highest rainfall in late spring/early summer.

CN-140-70 is a cow-calf and finishing operation located in Heilongjiang, China. This herd of Simmental animals is maintained by 40 head of beef cows. The cow-calf enterprise is situated on 21 ac with clay soils in a moist subtropical mid-latitude climate. Mean annual temperature is 4°C, and mean annual precipitation is 465mm, distributed primarily in July-August.



Production System and Physical Performance Indicators

Similarities

Comparison of **BC-2** and **CN-140-70** was chosen as these are two small-medium size herds, located in regions with similar mean annual temperature and precipitation for homegrown feed production.

Cow Performance and Weaning

Mature weight is considerably higher on **BC-2** (1,340 lb) as compared to **CN-140-70** (922 lb). This translates to heavier calves, with a 200-d adjusted weaning weight of 581 lb on **BC-2**, and 539 lb on **CN-140-70**. Calf death loss is low on both farms, at 3.3% **BC-2** and 1.0% on **CN-140-70**; the former is likely higher due to predation. This likely contributes to the difference in number of calves weaned per 100 cows, at 93 calves on **BC-2** and 100 on **CN-140-70**. The high weaning rate on **CN-140-70** suggests good conception and pregnancy rates on this farm.

Cattle Sales and Prices

BC-2 sells calves at weaning, whereas **CN-140-70** retains weaned calves for the finishing enterprise. As weaners, price per head is similar, at \$1,136/head for **BC-2** and \$1,073/head for **CN-140-70**. This in spite of a 20% larger weaning weight on **BC-2**.

Feed

BC-2 relies primarily on homegrown feeds, purchasing 3% of feedstuffs. **CN-140-70** purchases a larger share of feedstuffs, 23%, but is still reliant on homegrown feed. Winter feeding on **BC-2** consists of homegrown hay, grain screening pellets, salt, and mineral. Diets on **CN-140-70** are grazed (56%), supplemented with non-grass hay/silage, concentrates, and mineral. **BC-2** feeds winter diets in confinement; cows on **CN-140-70** have access to a winter barn.

	BC-2	CN-140-70
Beef cows (hd)	90	40
Breeds	Angus, Hereford, Simmental, Limousin	Simmental
Mature cow weight (lb)	1,340	922
Weaning age (d)	201	180
Weaning weight (lb)	584	485
200 day adjusted weaning weight (lb)	581	539
Weaning weight as % mature cow weight	44	53
Calf death loss	3.3%	1.0%
Calves weaned per 100 cows (hd)	93	100
Replacement rate (%)	9.4%	18.0%
Price per head for weaners sold (\$/hd)	1,136	1,073
Sale weight (lb)	584	485
Feed purchased (% as-is)	3%	23%
Income sources	Cow-calf	Cow-calf, retained ownership

Cow-calf Enterprise

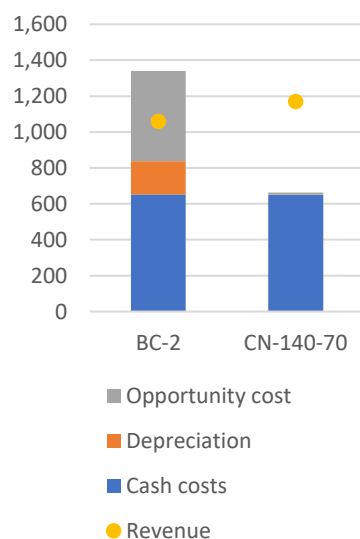
Cost and Profit

For comparison of costs and profits, a 5-year average (2016-2020) is used. **Total production costs** of the cow-calf enterprise (including cash cost, depreciation, and opportunity cost) on **BC-2** averaged \$1,340/cow. This is approximately twice the total production costs on **CN-140-70**, at \$663/cow.

Cash costs include purchased feed, cost of feed production including seed and fertilizer, land rent, wages, machine and building maintenance, interest on liabilities, veterinary and medicine costs, etc. On a per-cow basis, these are equal on both farms (\$652 on **BC-2** and \$651 on **CN-140-70**). However, this equates to 49% of total costs on **BC-2**, they account for 98% of total costs on **CN-140-70**.

Total costs of the cow-calf enterprise		
Costs (\$/cow)	BC-2	CN-140-70
Cash costs	652	651
Depreciation	186	1
Opportunity cost	502	11
<i>Land</i>	201	0
<i>Labour</i>	249	6
<i>Capital</i>	52	5
Total cost	1,340	663
Revenue	1,059	1,169
Short-term profit	407	519
Medium-term profit	221	518
Long-term profit	-281	507

Cost of Production (\$/cow)



Opportunity costs are calculated for unpaid family labour, owned land, and capital. Opportunity costs account for 37% of total costs on **BC-2**, and only 2% of total costs on **CN-140-70**. On both farms, opportunity cost of labour makes up the largest proportion of total opportunity costs. This cost is associated with unpaid family labour, particularly on **BC-2**, where all labour is unpaid family labour. Opportunity cost of land is also significant on **BC-2** (40% of opportunity cost), representing potential income from other uses of owned land, such as renting to neighbours. **CN-140-70** rents all land, thus does not incur and opportunity cost of land. Instead, opportunity cost of capital makes up the remainder (44%) of opportunity costs on this farm.

Revenue from the cow-calf enterprise, including weaned calf and cull sales, was \$1,059/cow on **BC-2**. This is 10% less than average revenue on **CN-140-70**, at \$1,169. This is in contrast to the difference in total cost, which impacts profitability measures for the cow-calf enterprise.

Both farms are able to cover both cash and depreciation costs, maintaining profitability in both the short- and medium-term. **Short-term profits** (revenue – cash costs) averaged \$407/cow on **BC-2**, and \$519/cow on **CN-140-70**. **Medium-term profits** (revenue – cash and depreciation costs) averaged \$221/cow on **BC-2**, and \$518/cow on **CN-140-70**. In the long-term, only **CN-140-70** is able to maintain profitability, due to low per-cow production costs. Average **long-term profits** (revenue – cash, depreciation, and opportunity costs) on **BC-2** were -\$281/cow, and \$507/cow on **CN-140-70**.

Cost Structure

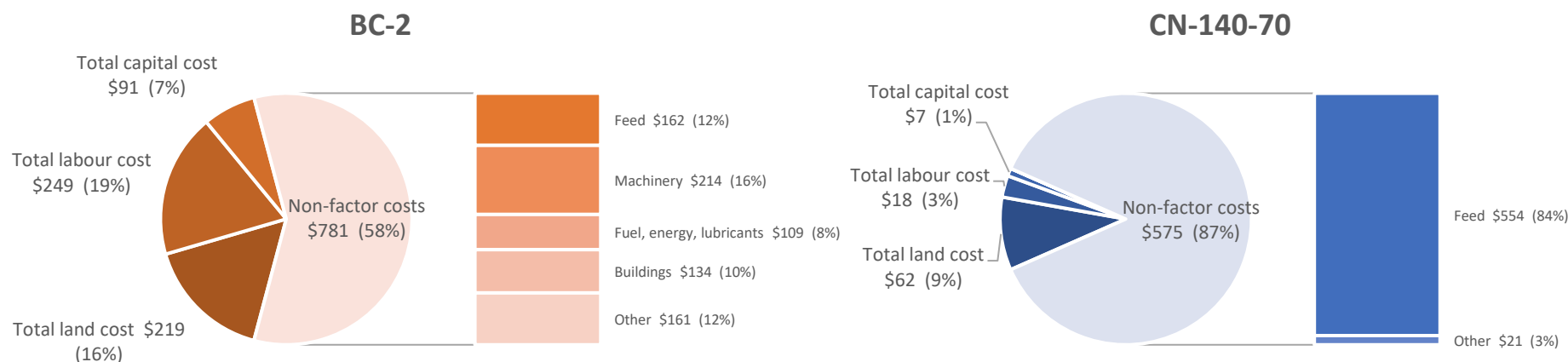
Total costs can be broken down as land, labour, capital, and non-factor costs. Due to the low per-cow costs on **CN-140-70**, total land, labour, capital, and non-factor costs are all higher on **BC-2**. Presented as percentages of total cost, there are additional differences in cost structure between the two farms.

Land costs account for a relatively small portion of total costs, at 16% and 9% of total costs on **BC-2** and **CN-140-70**, respectively. Per-cow, these costs are 3.5 times greater on **BC-2**. This is due to the difference in cow-calf acres, as **BC-2** operates on 1,211 ac, and **CN-140-70** on only 21 ac. This offsets the difference in land rents, which average \$122/ac on **CN-140-70**, and only \$13/ac on **BC-2**.

Labour costs account for 19% of total costs on **BC-2**, and only 3% of total costs on **CN-140-70**. Labour costs are higher on **BC-2** due to greater total labour hours (1,256 hrs vs. 229 hrs on **CN-140-70**), and higher cost of labour. Hourly wages on **BC-2** are calculated as \$17.82/hr for unpaid family labour. In contrast, wages on **CN-140-70** are \$2.95/hr for hired labour, and calculated as \$3.93/hr for unpaid family labour. All labour hours on **BC-2** are family labour, whereas the majority (72%) of labour hours on **CN-140-70** are hired labour.

Capital costs account for the smallest share of total costs, at 7% of total costs on **BC-2** and 1% of total costs on **CN-140-70**. On both farms, the majority of capital costs (57% and 73% for **BC-2** and **CN-140-70**, respectively) are own capital, followed by interest on liabilities.

Costs (\$/cow)	BC-2	CN-140-70
Total land cost	219	62
Total labour cost	249	18
Total capital cost	91	7
Non-factor costs	781	575
Animal purchases	21	0
Feed	162	554
Machinery	214	3
Fuel, energy, lubricants	109	3
Buildings	134	1
Vet & medicine	18	12
Insurance, taxes	49	0
Other inputs	73	1
Total costs	1,340	663



Non-factor costs make up the largest proportion of total costs, at 58% and 87% of total costs on **BC-2** and **CN-140-70**, respectively. The greatest non-factor cost on **BC-2** is **machinery** (27% of non-factor and 16% of total costs), which may be expected where there is a reliance on homegrown feeds. The next largest cost on **BC-2** are **feed costs**, which account for 21% of non-factor costs and 12% of total costs. These include purchased feedstuffs, land improvement, and seed costs on this farm. Feed costs also account for 96% of non-factor and 84% of total costs on **CN-140-70**, and are primarily associated with purchased feed. The remainder of non-factor costs on this farm are **veterinary and medical costs** (2% of non-factor costs), **machinery** (1%), and **fuel, energy, and lubricants** (1%). Other significant non-factor costs on **BC-2** are **buildings** (17%), and **fuel, energy, and lubricants** (14%).

Whole Farm

Other Farm Enterprises

In addition to the cow-calf enterprise, **CN-140-70** operates a finishing operation of 140 head. Both farms also gain additional revenue from other farm activities.

Cost and Profit

Total farm revenue on **BC-2** averaged \$100,018 over the 5-year period. The majority of this (95%) is market revenue from the cow-calf enterprise, with the remainder from other farm activities. In contrast, total farm revenue on **CN-140-70** averaged \$531,017, over 5 times that on **BC-2**. On this farm, the retained ownership enterprise accounts for 91% of total farm revenue, with only 9% attributed to the cow-calf enterprise.

Average total farm expenses were \$76,305 on **BC-2**. The largest sources of farm expenses were fixed costs (48% of total expenses), depreciation (22%), and the cow-calf enterprise (21%). On **CN-140-70**, 85% of expenses are incurred by the retained ownership enterprise, and only 6% by the cow-calf enterprise.

Both farms are able to maintain whole-farm profitability over the 5-year term. Despite negative long-term profits for the cow-calf enterprise, whole-farm **net income** on **BC-2** averaged \$23,714^a, and **net cash farm income** averaged \$40,298^b. **CN-140-70**, with a profitable cow-calf enterprise, and the addition of the finishing enterprise, averaged a net income of \$123,993^a, while net cash farm income averaged \$122,712^b.

Whole-farm cost and profit		
Costs (\$)	BC-2	CN-140-70
Revenue		
Market revenue	95,321	529,253
Cow-calf	95,321	46,772
Retained ownership	0	482,481
Other farm revenue	4,505	1,764
Change in inventory	193	0
Total farm revenue	100,018	531,017
Expenses		
Depreciation	16,782	483
Fixed costs	36,287	1,370
Wages, rent, interest	5,281	34,104
Cow-calf	16,232	22,441
Retained ownership	0	344,143
Crop production	1,722	4,623
Total farm costs	76,305	407,025
Profits		
Net income	23,714	123,993
Net cash farm income	40,298	122,712

^aThis is whole farm profitability, calculated as Market returns (+ coupled payments) (+ decoupled payments) – whole-farm costs +/- changes in inventory +/- capital gains/losses. Whole-farm costs include Direct costs enterprises, overhead costs, paid labour, paid rents, paid interest, depreciation

^bNet cash farm income = Whole farm profitability + depreciation + changes in inventory + capital gains/losses.