



Case Study - AB-5 vs. DE-300-0

Farm Descriptions

AB-5 is a cow-calf, backgrounding, and cash crop operation located in the Peace River Lowlands of Alberta, Canada. This farm keeps Angus animals, and a cow herd of 221 head. The cow-calf operation is situated on 2,378 ac with grey wooded, black, and dark brown soils. Mean annual temperature is 0.5°C, and mean annual precipitation range is 375-600mm.

DE-300-0 is a cow-calf operation located in Brandenburg, Germany, with a beef cow herd of 300 head. The operation is located on 991 ac with sandy soils, and moist continental mid-latitude climate. Mean annual temperature is 6°C, and mean annual precipitation is 600mm, evenly distributed throughout the year.



Production System and Physical Performance Indicators

Similarities

Comparison of **AB-5** and **DE-300-0** were chosen as these are two medium-large size herds with similar reproductive performance. For feed production, mean annual precipitation is similar, though mean temperature is significantly higher on **DE-300-0**. The retained ownership and cash crop enterprises on **AB-5**, compared to a larger cow-calf operation on **DE-300-0**, allows an interesting comparison.

Cow Performance and Weaning

Mature cow weight is slightly higher on **DE-300-0** (1,433 lb) than on **AB-5** (1,275 lb). The farms wean calves at a similar percentage of mature cow weight (43% on **AB-5** and 41% on **DE-300-0**), however this equates to calves being weaned approximately 6 weeks older on **AB-5** (251d) than on **DE-300-0** (210d). The 200d adjusted weaning weights show this difference in pre-weaning ADG.

The number of calves weaned per 100 cows is similar (84 and 83 calves on **AB-5** and **DE-300-0**, respectively). This is due to similar calving percentages, of 87% on **AB-5** and 85% on **DE-300-0**, as well as similar calf death loss rates (3.4% and 3.0%, respectively).

Cattle Sales and Prices

Sold as weaners, price per head is similar between the two farms, at \$1,244/head on **AB-5** and \$1,215/head on **DE-300-0**, at weights of 544 and 584 lb, respectively. However, **AB-5** will retain calves for the backgrounding operation, instead selling backgrounded animals at 600-660 lb.

Feeding

On **AB-5**, all land is in pasture. Winter diets for cows include grain silage, straw, greenfeed, hay, barley grain, salt, and mineral. Of a 184d winter feeding period, cows are fed in confinement for only 60d (calving). On **DE-300-0**, most land is as pasture, with some land for grass hay/silage. Cows have access to a winter barn.

	AB-5	DE-300-0
Beef cows (hd)	221	300
Breeds	Angus	Various
Mature cow weight (lb)	1,275	1,433
Weaning age (d)	251	210
Weaning weight (lb)	544	584
200 day adjusted weaning weight (lb)	433	557
Weaning weight as % mature cow weight	43	41
Price per head for weaners sold (\$/hd)	1,244	1,215
Calf death loss	3.4%	3.0%
Calves weaned per 100 cows (hd)	84	83
Replacement rate (%)	6.0%	16.0%
Sale weight (lb)	600-660	584
Income sources	Cow-calf, retained ownership, cash crop	Cow-calf

Cow-calf Enterprise

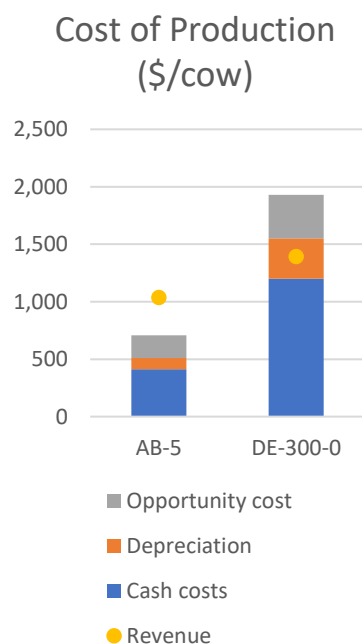
Cost and Profit

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 **AB-5** averaged \$708/cow. Total production costs on **DE-300-0** were over 2.7 times larger, at \$1,929/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. These are the largest costs incurred on both farms, accounting for a similar 58% and 62% of total production costs on **AB-5** and **DE-300-0**, respectively.

Depreciation on machinery, buildings, etc. accounts for 14% of total production costs on **AB-5**, and 18% of production costs on **DE-300-0**. This is the smallest share of total costs on both farms.

Total costs of the cow-calf enterprise		
Costs (\$/cow)	AB-5	DE-300-0
Cash costs	411	1,199
Depreciation	98	352
Opportunity cost	199	378
<i>Land</i>	76	37
<i>Labour</i>	53	264
<i>Capital</i>	70	77
Total cost	708	1,929
Revenue	1,036	1,393
Short-term profit	625	193
Medium-term profit	528	-158
Long-term profit	328	-536



Opportunity costs are calculated for unpaid family labour, owned land, and capital. Opportunity costs account for 28% of total production costs on **AB-5**, and 20% on **DE-300-0**. On **AB-5**, opportunity cost of land is the largest opportunity cost (38% of total opportunity cost). This represents the potential revenue gained from other uses of owned land, such as renting land to neighbours. Opportunity costs of capital (35%) and labour (27%) are also significant on this farm, indicating a variety of opportunities for this farm in allocating resources. On **DE-300-0**, 70% of total opportunity costs are opportunity costs of labour, which is attributable to a large number of unpaid family labour hours on this farm.

Revenue from the cow-calf enterprise, including weaned calf and cull sales, was \$1,036/cow on **AB-5**. Per-cow revenue from the cow-calf enterprise was 34% larger on **DE-300-0**, at \$1,393/cow.

Both farms operate a cow-calf enterprise that is profitable in the short-term. Average **short-term profits** (revenue – cash costs) were \$625/cow on **AB-5**, and \$193/cow on **DE-300-0**. **AB-5** remains profitable in the medium- and long-terms, with average **medium-term profits** (revenue – cash and depreciation costs) of \$528/cow, and average **long-term profits** (revenue – cash, depreciation, and opportunity costs) of \$328/cow. In contrast, **DE-300-0** is unable to cover medium- or long-term costs. On this farm, medium-term profits averaged -\$158/cow, and long-term profits averaged -\$536/cow.

Cost Structure

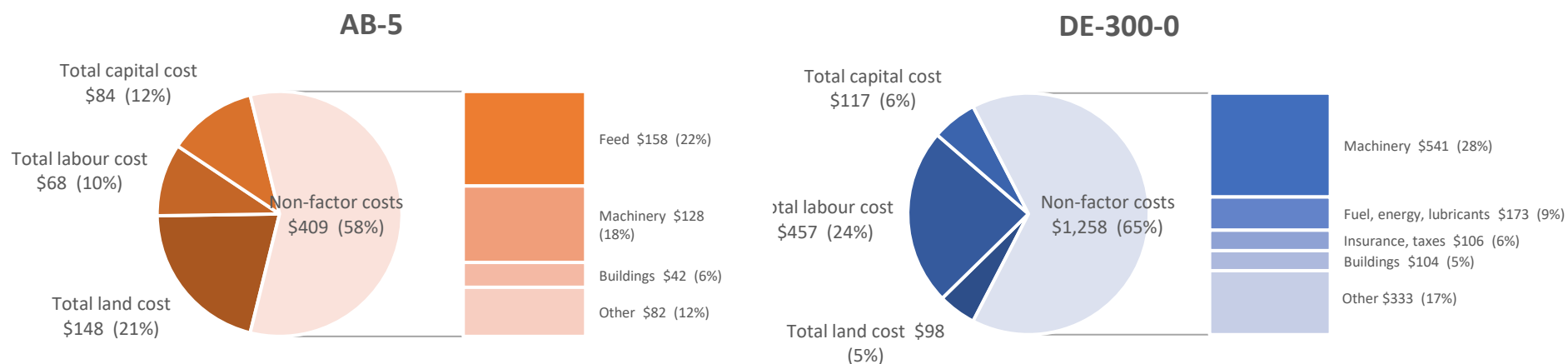
Total costs can be broken down as land, labour, capital, and non-factor costs. Total land costs are higher per-cow on **AB-5**, while total labour, capital, non-factor costs are higher on **DE-300-0**. Cost structure, where these costs are presented as a percentage of total costs, is also variable between the two farms.

Land costs account for 21% of total costs on **AB-5**, and only 5% of total costs on **DE-300-0**. While land rents are higher on **DE-300-0**, at an average of \$49/ac for rented and owned land, compared to an average \$17/ac on **AB-5**, the larger land acres on **AB-5** (2,378 ac vs. 991 ac on **DE-300-0**) and smaller cow herd size result in larger per-cow land costs.

Labour costs account for 10% of total costs on **AB-5**, and 24% of total costs on **DE-300-0**. **AB-5** logs 1,167 total labour hours annually. **DE-300-0** logs 7,030 hrs, over 6 times more than on **AB-5**. In addition to labour hours, labour prices are also higher on **DE-300-0**. Average wages, between paid wages and wages calculated for unpaid family labour, are \$19.48/hr, as compared to \$15.50/hr on **AB-5**. Both farms use a combination of both paid and unpaid family labour; unpaid family labour accounts for 86% of total labour hours on **AB-5**, and 50% of total labour hours on **DE-300-0**.

Capital costs account for 12% and 6% of total costs on **AB-5** and **DE-300-0**, respectively, the smallest share of total costs. On both farms, the majority of capital costs (83% and 66%, respectively) are own capital.

Costs (\$/cow)	AB-5	DE-300-0
Total land cost	148	98
Total labour cost	68	457
Total capital cost	84	117
Non-factor costs	408	1,257
Animal purchases	4	37
Feed	158	91
Machinery	128	541
Fuel, energy, lubricants	16	173
Buildings	42	104
Vet & medicine	20	71
Insurance, taxes	9	106
Other inputs	33	134
Total costs	708	1,929



Non-factor costs are the largest component of total costs, accounting for 58% of total costs on **AB-5**, and 68% of total costs on **DE-300-0**. On **AB-5**, the largest non-factor cost is **feed costs**, accounting for 39% of non-factor and 22% of total costs. The largest associated feed cost is fertilizer for homegrown feed, followed by feed purchases, and other inputs for feed/forage production. Other significant non-factor costs on **AB-5** are **machinery** costs (31% of non-factor costs) and **building** costs (10%). On **DE-300-0**, machinery costs are the largest non-factor cost, accounting for 43% of non-factor and 28% of total costs. This is composed of depreciation and contract labour, with a small share associated with machinery maintenance. Also significant are **fuel, energy, and lubricant** costs (14% of non-factor costs), which are likely associated with high machinery costs, **insurance and taxes** (8%), and **building** costs (8%).

Whole Farm

Other Farm Enterprises

AB-5 generates additional market revenue from backgrounding and cash crop enterprises. **DE-300-0** acquires some additional revenue from other farm activities, but also has significant income from government payments.

Cost and Profit

Average **total farm revenue** on **AB-5** was \$495,921 over the 5-year period. Market revenue from the cow-calf enterprise was the largest source of revenue (46% of total), followed closely by the backgrounding operation (44%), and then the cash crop enterprise (10%). Total revenue on **DE-300-0** averaged \$586,267. The cow-calf enterprise was the largest source of revenue on this farm as well, accounting for 53% of revenue. The remainder of whole farm revenue is from government payments (45% of total) and other farm revenue (1%).

Total farm expenses averaged \$425,874 on **AB-5**. The largest shares of expenses were incurred by the backgrounding enterprise (51% of total expenses), following by the cash crop enterprise (16%), and depreciation (13%). Meanwhile, the cow-calf enterprise only accounts for only 7% of total expenses. On **DE-300-0**, average total farm expenses were \$475,617 over the 5-year period. Fixed costs were the most significant expense (33% of total expenses), followed by depreciation (23%), wages, rent, and interest (19%), the cow-calf enterprise (17%), and feed crop production (8%).

Whole-farm cost and profit		
Costs (\$)	AB-5	DE-300-0
Revenue		
Market revenue	495,921	311,292
Cow-calf	228,964	311,292
Retained ownership	216,902	0
Crop production	50,055	0
Other farm revenue	6	8,436
Government payments	0	266,539
Total farm revenue	495,926	586,267
Expenses		
Depreciation	53,755	108,060
Fixed costs	23,685	158,016
Wages, rent, interest	32,209	91,234
Cow-calf	29,470	79,505
Retained ownership	217,704	0
Crop production	69,068	38,802
Total farm costs	425,874	475,617
Profits		
Net income	70,052	110,651
Net cash farm income	123,802	217,748

Just as **AB-5** maintains a profitable cow-calf enterprise, this farm also achieves whole-farm profitability. With the addition of the backgrounding and cash crop enterprises, whole-farm **net income** averaged \$70,052^a over the 5-year period, and **net cash farm income** averaged \$123,802^b. **DE-300-0**, whose cow-calf operation was unprofitable in both the medium- and long-terms, was also able to achieve whole-farm profitability due to sizable government payments and additional revenue generated by other farm activities. Whole-farm net income on **DE-300-0** averaged \$110,651^a and net cash farm income averaged \$217,748^b over the 5-year period.

^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.