

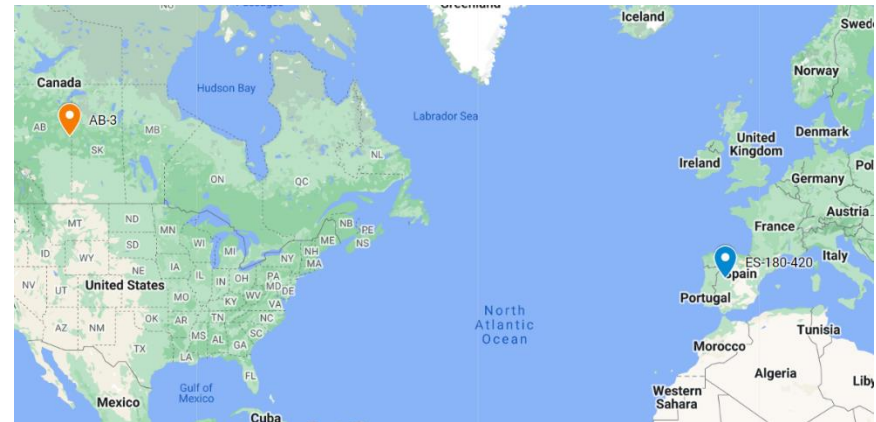


Case Study - AB-3 vs. ES-180-420

Farm Descriptions

AB-3 is a mixed cow-calf, backgrounding, and cash crop operation located in the Rocky Mountain Natural Region of Alberta, Canada. Angus and Simmental animals are kept, and 172 head of beef cows maintain the cow-calf operation. The cow-calf enterprise is located on 2,116 acres in a grey-wooded (luvisolic) soil zone. The climate is dry and semi-arid; mean annual temperature is 3°C, and mean annual precipitation 450mm, of which the majority falls April-August.

ES-180-420 is a cow-calf and finishing operation in Guijuelo, Salamanca, Spain. A beef cow herd of 180 head maintains a cross-bred cow-calf operation. The cow-calf enterprise is located on 865 ac, in which silty clay loam soils predominate. Mean annual temperature is 11.7°C. The area is dry, with a mean annual precipitation of 382mm, falling primarily from November through January.



Production System and Physical Performance Indicators

Similarities

Comparison of **AB-3** and **ES-180-420** was chosen due to similarities in beef cow herd size, cow weight, retained ownership of weaned animals, and number of retained animals sold per year. Both farms are situated in dry climates, though mean annual temperature is much higher on **ES-180-420**.

Cow Performance and Weaning

Mature cow-weight is similar, though slightly higher on **ES-180-420** (1,323 lb) than **AB-3** (1,290 lb). Calves are weaned older and heavier on **AB-3**, though 200-d adjusted weaning weight is greater for **ES-180-420**. As such, price per head for weaned animals is greater on **AB-3**, at \$1,080/head, as compared to \$978/head on **ES-180-420**.

While calf death loss is greater on **AB-3** (8%) than **ES-180-420** (3%), a greater number of calves are weaned per 100 cows. This suggests conception and/or pregnancy rates are lower on **ES-180-420**, which is supported by the greater cow herd replacement rate.

Cattle Sales and Prices

AB-3 sells 100 head of retained calves (backgrounded) annually, while **ES-180-420** sells 108 head weaned calves to the finishing operation. As **AB-3** backgrounds, and **ES-180-420** feeds to finish, sale weight of retained animals on **AB-3** is approximately half of that on **ES-180-420**.

Feed

There is great disparity in the percentage of feed purchased; **AB-3** purchases only 1% of feed (as-is), where **ES-180-420** purchases over half (56%, as-is) of all feedstuffs. Both farms provide winter rations for cows outdoors. On **AB-3**, cows are first swath grazed in fall, then receive a hay-based winter ration supplemented with silage, straw, salt, and mineral. **ES-180-420** supplements winter grazing (44% of diet) with other forages (45%) and concentrates (11%).

	AB-3	ES-180-420
Beef cows (hd)	172	180
Breeds	Angus, Simmental	Crosses
Mature cow weight (lb)	1,290	1,323
Weaning age (d)	208	195
Weaning weight (lb)	533	512
200 day adjusted weaning weight (lb)	513	526
Weaning weight as % mature cow weight	41	39
Price per head for weaners sold (\$/hd)	\$1,080	\$978
Calf death loss	8%	3%
Calves weaned per 100 cows (hd)	83	80
Replacement rate (%)	9%	16%
Annual sales – retained animals (hd)	100	108
Sale weight – retained animals (lb)	560-670	1,217
Feed purchased (% as-is)	1%	56%
Income sources	Cow-calf, retained ownership, crop	Cow-calf, retained ownership

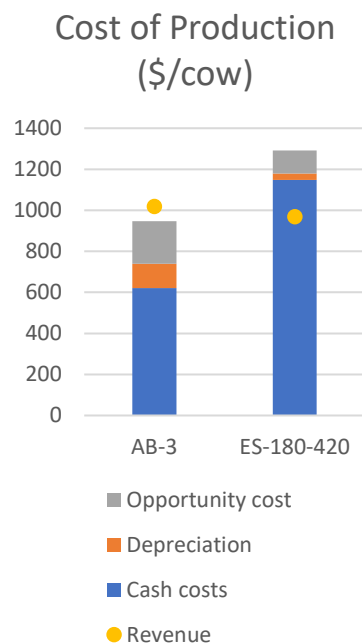
Cow-calf Enterprise

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 **AB-3** averaged \$973/cow from 2016-2020. In contrast, total cost is 33% higher on **ES-180-420**, at \$1,291/cow.

Cash costs include purchased feed, costs of feed production including seed and fertilizer, land rent, wages, machine and building maintenance, interest on liabilities, veterinary and medicine costs, etc. These costs make up the largest proportion of total costs on both farms, at 66% of total cost on **AB-3**, and 89% of costs on **ES-180-420**.

Total costs of the cow-calf enterprise		
Costs (\$/cow)	AB-3	ES-180-420
Cash costs	646	1,149
Depreciation	118	30
Opportunity cost	209	112
<i>Land</i>	144	19
<i>Labour</i>	50	75
<i>Capital</i>	15	19
Total cost	973	1,291
Revenue	1,018	968
Short-term profit	372	-181
Medium-term profit	254	-211
Long-term profit	46	-323



Opportunity costs are calculated for owned land, unpaid family labour, and capital. Overall, opportunity costs are considerably different between farms. These costs account for 22% of total costs on **AB-3**, and 9% of total costs on **ES-180-420**. Moreover, the composition of total opportunity cost also differs. On **AB-3**, the greatest opportunity cost is that for land (69%). **AB-3** owns 42% of total farmland, thus these costs represent potential revenue lost from other land uses, such as renting owned land to neighbours. Meanwhile, the greatest contributor to opportunity cost on **ES-180-420** is that of labour. This is associated with higher family labour hours, and calculated wages for family labour, on this farm.

Revenue from the cow-calf enterprise, including weaned calf and cull animal sales, averaged \$1,018/cow on **AB-3**, and a similar \$968/cow on **ES-180-420** over the 5-year period. Where **AB-3** had significantly lower per-cow costs, this farm also receives 5% higher revenue per-cow compared to **ES-180-420**, which results in stark differences in profitability of the respective cow-calf enterprises.

Where **AB-3** is profitable in the short-, medium-, and long-terms, **ES-180-420** is unprofitable in all terms over the 5-year period. **Short-term profits** (revenue – cash costs) averaged \$372/cow for **AB-3**, and -\$181/cow on **ES-180-420**. In the **medium-term** (revenue – cash and depreciation costs), profits averaged \$254/cow on **AB-3**, and -\$211/cow on **ES-180-420**. **AB-3** remains profitable in the long term, just covering costs with an average **long-term profit** (revenue – cash, depreciation, and opportunity costs) of \$46/cow. Meanwhile, long-term profits averaged -\$323/cow on **ES-180-420**.

Cost Structure

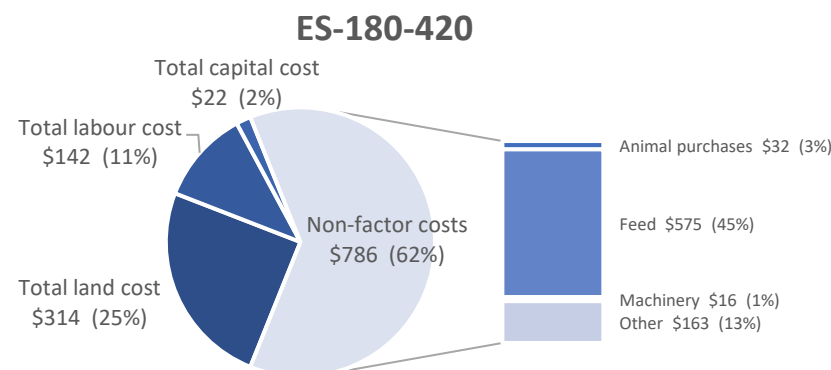
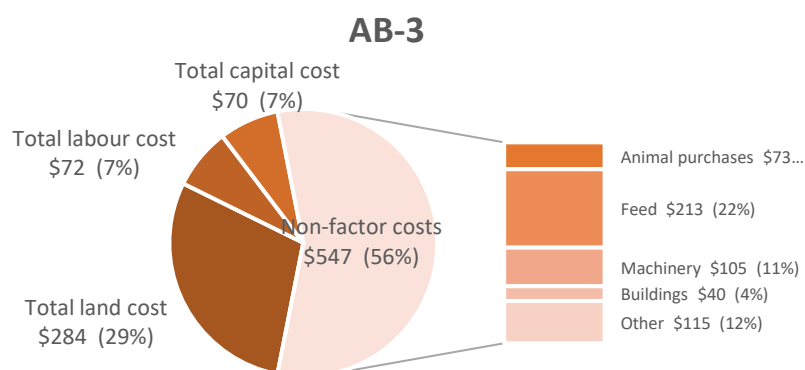
Total costs can be broken down as land, labour, capital, and non-factor costs. Total land, labour, and non-factor costs are higher per-cow on **ES-180-420**, while total capital costs are higher on **AB-3**. However, as percentages of total cost, these categories make for similarly composed total costs between the two farms.

Land costs account for 29% of total cost on **AB-3**, and 24% of total cost on **ES-180-420**. Land rent and rent calculated for owned land are both significantly higher on **ES-180-420**, averaging \$74/ha, as compared to an average of \$24/ha on **AB-3**. However, this is offset by the difference in cow-calf land acres, where **AB-3** maintains 2,116 ac, as compared to **ES-180-420's** 856 ac, resulting in similar per-cow land costs.

Labour costs account for 7% of total costs on **AB-3**, and a similar 11% of total costs on **ES-180-420**, despite being almost half that of **ES-180-420** on a per-cow basis. These higher labour costs on **ES-180-420** can be attributed to a greater number of labour hours (1,616 hr vs. 894 hr on **AB-3**). **AB-3** relies primarily on unpaid family labour (78% of all labour hours), while hired and unpaid family labour account for an equal share of hours on **ES-180-420**. Wages (paid and calculated for unpaid labour) average slightly higher on **ES-180-420**, at \$16.80/hr, as compared to \$15.72/hr on **AB-3**.

Capital costs account for the smallest proportion of total costs, at 7% and 2% of total costs on **AB-3** and **ES-180-420**, respectively. On **AB-3**, 79% of capital costs are interest on liabilities, where on **ES-180-420**, the majority (83%) of capital costs are interest on liabilities.

Costs (\$/cow)	AB-3	ES-180-420
Total land cost	284	314
Total labour cost	72	142
Total capital cost	70	22
Non-factor costs	547	813
Animal purchases	73	32
Feed	213	575
Machinery	105	16
Fuel, energy, lubricants	22	42
Buildings	40	0
Vet & medicine	34	54
Insurance, taxes	14	42
Other inputs	45	25
Total costs	973	1,291



Non-factor costs are the largest contributors to total costs, accounting for 56% and 64% of total cost on **AB-3** and **ES-180-420**, respectively. On both farms, **feed costs** are the largest component of non-factor costs. As **AB-3** relies primarily on homegrown feeds, feed costs are associated with homegrown feed, including fertilizer (\$75/cow), seed (\$61/cow), herbicide (\$27/cow), and other land inputs (\$29/cow). On **ES-180-420**, feed costs are associated entirely with purchased feed. Other differences in non-factor costs include higher costs associated with **animal purchases** (13% of non-factor costs), **machinery** (19%) and **buildings** (7%) on **AB-3**, as compared to **ES-180-420** (4%, 2% and 3% of non-factor, respectively). High machinery costs on **AB-3** may be associated with the reliance on home-grown feeds. A similar share of non-factor costs is associated with **fuel** (4% and 5%), **veterinary and medical costs** (6% and 7%), and **insurance and taxes** (3% and 5%) on **AB-3** and **ES-180-420**, respectively.

Whole Farm

Other Farm Enterprises

In addition to the cow-calf operation, **AB-3** generates additional farm revenue from retained ownership (backgrounding) and cash crop enterprises. **ES-180-420** also receives additional farm revenue from a retained ownership (finishing) enterprise with 420 head.

Cost and Profit

On **AB-3**, the cash crop enterprise contributes the largest share of **total revenue** (44%), followed by the cow-calf (29%) and backgrounding (24%) enterprises. Additional farm revenue accounts for 3% of total revenue, and a very small proportion (0.4%) is from government payments. On **ES-180-420**, the majority of farm revenue comes from the finishing enterprise (74%). A similar share of revenue is from the cow-calf enterprise (12%) and government payments (13%).

Similar to farm revenue, the greatest share of **total farm expenses** on **AB-3** is attributed to the cash crop enterprise (33%). The cow-calf enterprise, meanwhile, accounts for only 7% of total farm expenses. The backgrounding enterprise (24%), wages, rent, and interest (18%), and depreciation (15%) are all more significant contributors to total farm costs on **AB-3**. Meanwhile, on **ES-180-420**, the majority of total farm expenses can be attributed to the finishing enterprise (74%), and only 11% to the cow-calf enterprise.

Whole-farm cost and profit		
Costs (\$)	AB-3	ES-180-420
Revenue		
Market revenue	589,358	1,025,182
Cow-calf	173,554	146,065
Retained ownership	148,030	879,116
Cash crop	267,774	0
Other farm revenue	16,680	0
Government payments	2,240	155,185
Total farm revenue	608,278	1,180,366
Expenses		
Depreciation	74,135	37,473
Fixed costs	14,550	73,440
Wages, rent, interest	85,892	85,440
Cow-calf	32,532	126,415
Retained ownership	115,656	882,014
Crop production	158,309	0
Total farm costs	481,076	1,186,563
Profits		
Net income	127,202	-6,197
Net cash farm income	201,331	31,276

As with the cow-calf enterprise, **AB-3** remains profitable at the whole-farm level over the 5-year period, with an average **net income** of \$127,202^a, and average **net cash farm income** of \$201,331^b. While **ES-180-420** operates an unprofitable cow-calf enterprise, and has an average net income of -\$6,197^a, a profitable finishing enterprise allows the farm to achieve an average net farm cash income of \$31,276^b.

^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.