Case Study - SK-5 vs. US-160-0

# **Farm Descriptions**

**SK-5** is a mixed cow-calf and cash crop operation located in Saskatchewan, Canada, within the Moist Mixed Grassland ecoregion. This farm has purebred and commercial animals, and maintains a beef cow herd of 135 head. The cow-calf enterprise is situated on 2,193 ac with dark brown chernozemic soils over glacial till. The climate is semi-arid. Mean annual temperature is 2.5°C, and mean annual precipitation range is 350-400mm, with highest rainfall in May-June.

**US-160-0**

**SK-5**

**US-160-0** is a mixed cow-calf and cash crop operation located in Kansas, United States. This farm keeps 159 head of beef cows to maintain its commercial herd. The cow-calf enterprise is situated on 1,721 ac with silt loam soils. The climate is dry semi-arid. Mean annual temperature is 6°C, and mean annual precipitation is 396mm. The main period of precipitation is April-September, peaking in June.

# **Production System and Physical Performance Indicators**

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| --- | --- | --- |
|  | SK-5 | US-160-0 |
| Beef cows (hd) | 135 | 159 |
| Breeds | Purebred Charolais Angus, Simmental; Commercial | Crosses |
| Mature cow weight (lb) | 1,300 | 1,200 |
| Weaning age (d) | 179 | 210 |
| Weaning weight (lb) | 611 | 650 |
| 200 day adjusted weaning weight (lb) | 682 | 619 |
| Weaning weight as % mature cow weight | 47 | 54 |
| Calf death loss | 3.0% | 5.0% |
| Calves weaned per 100 cows (hd) | 89 | 92 |
| Replacement rate (%) | 13.5% | 12.0% |
| Price per head for weaners sold ($/hd) | 1,182 | 1,123 |
| Feed purchased (%) | 30% | 7% |
| Income sources | Cow-calf, crop | Cow-calf, crop |

## Similarities

Comparison of **SK-5** and **US-160-0** was chosen as these are mixed cow-calf and cash crop operations with medium sized herds, under similar climatic conditions for crop production.

## Cow Performance and Weaning

Mature cow weight on **SK-5** is 1,499 lb, 25% heavier than the 1,200 lb mature cows on **US-160-0**. **SK-5** weans calves approximately 4.5 weeks younger, at a lighter weight, and therefor at a lower percentage of mature cow weight, than on **US-160-0**. The 200d adjusted weaning weights (682 lb on **SK-5**, 619 lb on **US-160-0**), though, show heavier calves on **SK-5**.

Calf death loss is slightly higher on **US-160-0** (5.0%) than on **SK-5** (3.0%), though **US-160-0** weans more calves per 100 cows (92) than **SK-5** (89). This may suggest differences in fertility between farms. A slightly higher calving percentage on **US-160-0** (96%) as compared to **SK-5** (92%) may support this.

## Cattle Sales and Prices

Both **SK-5** and **US-160-0** sell calves at weaning. **SK-5** sells weaned calves at 611 lb, at an average price of $1,182/head. On **US-160-0**, weaners at sold at 650 lb for an average price of $1,123/head. This is 5% less than prices received on **SK-5**, despite a 6% larger sale weight.

## Feeding

On **SK-5**, following a period of aftermath grazing in fall, cows receive a winter diet consisting of cereal silage, hay, straw and chaff, cereal screening, camelina meal, salt, and mineral. Winter diets are provided on pasture. On **US-160-0**, cows graze throughout the year, but are supplemented with grass hay/silage in winter (55%). **SK-5** purchases 30% of feedstuffs provided, and **US-160-0** purchases 7%.

|  |  |  |
| --- | --- | --- |
| Total costs of the cow-calf enterprise | | |
| Costs ($/cow) | **SK-5** | **US-160-0** |
| Cash costs | 1,160 | 1,009 |
| Depreciation | 172 | 49 |
| Opportunity cost | 478 | 230 |
| *Land* | 188 | 125 |
| *Labour* | 290 | 91 |
| *Capital* | 0 | 14 |
| Total cost | 1,810 | 1,288 |
| Revenue | 1,085 | 1,041 |
| Short-term profit | -74 | 33 |
| Medium-term profit | -246 | -17 |
| Long-term profit | -725 | -247 |

# **Cow-calf Enterprise**

## Cost and Profit

For comparison of cow-calf 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 **SK-5** averaged $1,810/cow over the 5-year period. This is 40% larger than total costs incurred on **US-160-0**, at an average of $1,288/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. Cash costs make up a considerable share of total costs on both farms. These account for 64% of total costs on **SK-5**, and 78% of total costs on **US-160-0**.

**Depreciation** on machinery, building, etc., accounts for a smaller share of total costs, at 10% and 4% of total costs on **SK-5** and **US-160-0**, respectively.

**Opportunity costs** are calculated for owned land, unpaid family labour, and capital. On **SK-5**, the largest opportunity cost (61% of opportunity cost) is opportunity cost of labour. This is due to a large number of unpaid family labour hours on this farm. On **US-160-0**, over half (54%) of opportunity costs is opportunity cost of land. This cost represents potential revenue generated from alternative uses of owned land, such as renting land to neighbours.

**Revenue** from the cow-calf enterprise, including weaned calf and cull sales, was $1,085/cow on **SK-5**. This is comparable to cow-calf revenue on **US-160-0**, of $1,041/cow. Considering that cow-calf production costs are 40% larger on **SK-5**, this will be reflected in profitability measures of the respective cow-calf enterprises.

The cow-calf enterprise on **SK-5** is unprofitable in all of the short-, medium-, and long-terms. Average **short-term profits** (revenue – cash costs) on this farm were -$74/cow. Average **medium-term profits** (revenue – cash and depreciation costs) were -$246/cow, and average **long-term profits** (revenue – cash, depreciation, and opportunity costs) were -$724/cow. **US-160-0** is able to cover short-term (cash) costs, with an average short-term profit of $33/cow. However, this farm, too, is unprofitable in the medium- and long-terms. Medium-term profits averaged -$17/cow, and long-term profits -$247/cow over the 5-year period.

|  |  |  |
| --- | --- | --- |
| Costs ($/cow) | SK-5 | US-160-0 |
| Total land cost | 240 | 510 |
| Total labour cost | 521 | 109 |
| Total capital cost | 176 | 20 |
| Non-factor costs | 873 | 648 |
| Animal purchases | 35 | 17 |
| Feed | 232 | 345 |
| Machinery | 94 | 47 |
| Fuel, energy, lubricants | 130 | 41 |
| Buildings | 104 | 3 |
| Vet & medicine | 25 | 36 |
| Insurance, taxes | 54 | 0 |
| Other inputs | 199 | 161 |
| Total costs | 1,810 | 1,288 |

## Cost Structure

**Total costs** can be broken down as land, labour, capital, and non-factor costs. Per-cow total land costs are higher on **US-160-0**, while total labour, capital, and non-factor costs are higher on **SK-5**. Cost structure, wherein these costs are presented as a percentage of total costs, is also variable between the two farms.

**Land costs** account for 13% of total costs on **SK-5**, and 40% of total costs on **US-160-0**. While US-60-0 maintains a smaller land-base (1,721 ac) than **SK-5** (1,293 ac), and a smaller cow herd, per-cow land costs are over twice that of **SK-5**. This is due to differences in land rents. Between rents paid and rents calculated for owned land, average land rents are $48/ac on **US-160-0**, as compared to $14/ac on **SK-5**.

**Labour costs** account for 29% of total costs on **SK-5**, and only 8% of total costs on **US-160-0**. Total labour hours on **SK-5** are 3,331 hrs, over 6 times the total labour hours logged on **US-160-0** (530 hrs). The difference in total labour hours overcomes the difference in labour prices, which are higher on **US-160-0**, at an average $28.77/hr, as compared to $21.46/hr on **SK-5**. Both farms utilize both hired and unpaid family labour. Unpaid family labour hours account for 46% and 68% of total labour hours on **SK-5** and **US-160-0**, respectively.

**Capital costs** are the smallest share of total costs on both farms. Capital costs account of 10% of total costs on **SK-5**, of which all costs are interest on liabilities. On **US-160-0**, capital costs account for only 2% of total costs, with the majority of capital costs (67%) as own capital.

**Non-factor costs** account for the largest share of total costs, at 48% of total costs on **SK-5**, and a similar 50% of total costs on **US-160-0**. On both farms, the most significant non-factor costs are **feed costs**. These account for 27% of non-factor and 13% of total costs on **SK-5**, and 53% of non-factor and 27% of total costs on **US-160-0**. Despite differences in amount of feed purchased, purchased feed is the feed cost on both farms, followed by inputs for homegrown feed production. Other significant non-factor costs on **SK-5** are **fuel, energy, and lubricants** (15% of non-factor costs), primarily diesel for vehicles, and **building** costs (12%). On **US-160-0**, general farm maintenance and spare parts (classified as “other” cow-calf inputs) is the next-largest non-factor costs ($92/cow or 14% of non-factor costs).

# **Whole Farm**

|  |  |  |  |
| --- | --- | --- | --- |
| Whole-farm cost and profit | | | |
| Costs ($) | **SK-5** | | **US-160-0** |
| Revenue | | | |
| Market revenue | 156,367 | | 907,116 |
| Cow-calf | 146,509 | | 165,536 |
| Cash crop | 9,858 | | 741,580 |
| Other farm revenue | 1,667 | | 58,527 |
| Government payments | 0 | | 21,334 |
| Total farm revenue | 158,034 | | 986,976 |
| Expenses | | | |
| Depreciation | 24,104 | | 45,737 |
| Fixed costs | 44,843 | | 0 |
| Wages, rent, interest | 63,883 | | 127,206 |
| Cow-calf | 33,276 | | 67,772 |
| Crop production | 19,102 | | 299,463 |
| Total farm costs | 185,209 | | 540,177 |
| Profits | | | |
| Net income | | -27,175 | 446,799 |
| Net cash farm income | -3,070 | | 491,541 |

## Other Farm Enterprises

In addition to the cow-calf enterprise, both **SK-5** and **US-160-0** generate additional farm revenue from a cash crop enterprise, as well as other farm activities. **US-160-0** also receives government payments.

## Cost and Profit

**Total farm revenue** on **SK-5** averaged $158,107 over the 5-year period. Market revenue from the cow-calf enterprise accounted for 93% of whole-farm revenue, followed by the cash crop enterprise (6%), and other farm activities (1%). Total farm revenue on **US-160-0** averaged $986,976 over the 5-year period, over 6 times the total revenue on **SK-5**. On **US-160-0**, the majority of farm revenue (75%) is market revenue from the cash crop enterprise. Only 17% of revenue is market revenue from the cow-calf enterprise.

**Total farm expenses** on **SK-5** averaged $185,209 over the 5-year period. Wages, rent, and interest were the largest expenses incurred on this farm (34% of total expenses), followed by fixed costs (24%), and the cow-calf enterprise (18%). On **US-160-0**, total farm expenses averaged $540,177. Similar to total costs, the cash crop enterprise is the largest source of expenses on this farm (55%). This is followed by wages, rent, and interest (24%), and the cow-calf enterprise (13%).

The cow-calf enterprise on **SK-5** was not profitable in the short-, medium-, or long-terms. Despite the additional farm revenue from the cash crop enterprise and other farm activities, **SK-5** remains unprofitable at the whole-farm level. Average **net income** for **SK-5** was -$27,175a over the 5-year period, and average **net cash farm income** was -$3,070. In contrast, the success of the cash crop enterprise, as well as additional revenue from other farm activities and government payments received by **US-160-0**, allow this farm to achieve whole-farm level profitability. Over the 5-year period, net income averaged $446,799a, and net farm cash income averaged $491,541b.

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.

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