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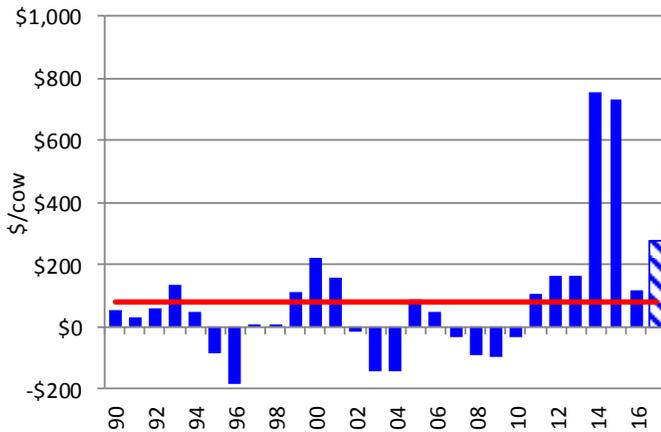
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Production & Management Practices that Drive Profitability

INTRODUCTION

The Canadian cow-calf sector saw increased returns in 2014 and 2015 with skyrocketing cattle prices. However, as cattle prices stabilized and cattle inventories increased in North American, cow-calf returns has realigned with the long-term (1991-2016) average at around \$82/cow.

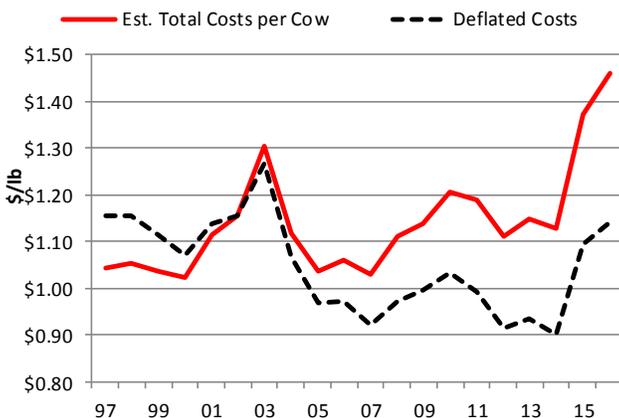
Alberta Cow/Calf Returns



Source Canfax Research

Historically, the Canadian cow-calf sector has been a thin-margin sector. The average cow-calf returns during 1990-2013 before the big rally was estimated at \$23/cwt.

Alberta Cow/Calf Deflated Cost of Production

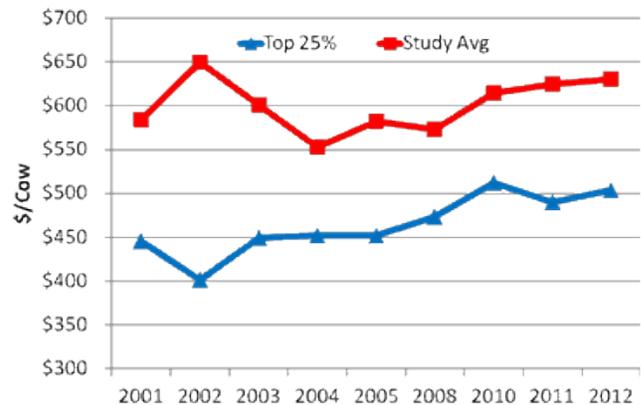


Source: Canfax Research

In the past 20 years, estimated average per unit cost of production (COP) in the cow-calf sector has increased more than 25% from \$1.04 to \$1.46/cwt (for a 1200 lb cow), with increased costs in feed, labour, fuel and land. The increase has been especially rapid in the past five years with a 31% increase from \$1.11/cwt in 2012 to \$1.46/cwt in 2016, making it increasingly important for all producers to watch their costs and cost structures carefully.

Despite thin margin and higher COP on average, a study by Western Beef Development Centre (WBDC) found that there is big difference in COP between the study average and low-cost producers (top 25%) – at least \$100/cow or >20% difference during 2001 to 2012. As cow-calf returns realign with the long-term average, this 20% difference is crucial for a producer as it could make a difference between being profitable or unprofitable.

Variation in Cost of Production (\$/cow wintered)



Source: WBDC, COP Studies, various years

What are these top 25% of producers doing differently from other producers? And what are the top production practices that drive profitability? These questions were discussed at the June 2017 *agri benchmark* Conference hosted by Canfax Research Services in Saskatoon, Saskatchewan with beef economists from around the world.

agri benchmark is an international, independent and non-profit network that uses a consistent methodology to compare production systems and their economics worldwide. In the area of beef production, this provides a unique data set addressing the challenges of different production practices.

The top production and management practices that contribute to profitability in the cow-calf and finishing sectors across different production systems were discussed. Cow-calf production systems were grouped based on winter feeding methods including: winter barns¹, grass/rangelands systems², and year-round pasture/supplemented³. These top production practices include the ones that have the biggest impact on per unit profitability, as well as those most commonly overlooked but may make a difference between profitable or unprofitable in low prices years.

This fact sheet summarizes of the top production/management practices identified at the conference, and includes recent studies and market information related to these practices.

A. GENERAL MANAGEMENT

General management practices such as record keeping, benchmarking, marketing strategies, and risk management were among the top-ranking practices in all production systems.

1. Record Keeping and Benchmarking

“You cannot manage what you cannot measure.” Record keeping and benchmarking was named as one of the most important management practices that drives profitability.

Record keeping includes a wide range of information, which can be categorized into three groups: production record, operational records, and financial records. Production records track the age of the cow, inventories, reproductive efficiency, growth performance, pasture or feed usage, animal health, etc. Operational records include overhead, unpaid labour hours, etc. Financial records track all expenses, revenue, overall profitability of the operation, per unit COP by commodity, etc. It is important for producers to identify the information they need when

¹ Cattle are fed in barns during winter, typically with silage and/or hay feeding.

² Mainly based on grazing with mineral supplements. Typically has low stocking rates.

making management decisions, and tailor their record keeping system for their needs.

While collecting, maintaining, and analyzing these records requires an investment in time, the ability to make decisions based on a known history is invaluable. By comparing against the operation’s own history, producers can identify the key factors that influence profit and concentrate on improving those areas. By comparing and benchmarking against other operations, producers can identify the gaps and learn from top performers.

In the UK, there has been a program that collects margins and fixed costs every year since 1969. The data is collected through a focus group approach. One of the key findings from the program is that farmers learn from other farmers. When they get together in groups they share what is going on, compare with the benchmark, and learn from top-performing producers to drive improvement.

A study at the University of Saskatchewan (Manglai, 2016) found that the use of benchmarking and record keeping lead to increased beef production efficiency. Cow-calf producers who use benchmarking could increase total beef production by roughly 60 lbs per exposed female. This translates into \$12,600 additional revenue for a 100-head cow herd, assuming current calf prices of \$2.10/lb.

Table 1. Potential Economic Benefits from Benchmarking

Increased Beef Production	Number of Exposed Female	Calf Prices	Additional Revenue
60 lbs/head	100 head	\$2.10/lb	\$12,600

Source: CRS calculation based on Manglai, 2016

The study also shows that market oriented cow-calf producers who focus meeting their customers’ needs and monitoring competitors’ actions, and learning oriented cow-calf producers who are open-minded and committed to learning, are most likely use record keeping and benchmarking.

Based on a survey of 67 cattle producers in the prairie provinces, only 40.6% of the respondents keep detailed production records, and only 36.7% indicated that they were familiar and used benchmarking (Manglai, 2016). Jeff Millang of Alberta Agriculture pointed out in “Key Success Factor in Cow Calf Enterprise Profitability” that *a major*

³ No barn during winter, use cover or shed sometimes. Feeds are mainly based on grazing plus hay/silage.

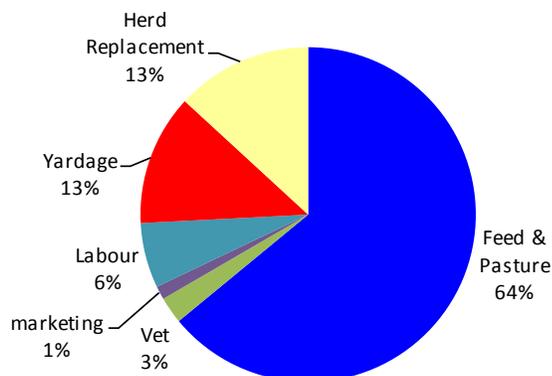
challenge facing Alberta and North American cow calf producers is the development, understanding, and use of their own farm production cost and returns information. It is critical for producers to use their 'own farm facts' in making knowledgeable business management decisions.

2. Cost Management

Feed is the largest cost of maintaining a cow herd. It is estimated that on average feed and pasture costs account for more than 60% of total production cost of cow-calf enterprises in western Canada. Managing feed cost is critical to the profitability of a cow-calf operation.

Typically, a longer winter feeding period associate with higher costs. Extending grazing season, utilization of forage throughout the grazing season and the use of alternative feeds are reported as some of the key production practices that drive profitability in western Canada.

Cow-Calf Cost of Production, 2012-2016 Avg.



Source: Canfax Research

Feeding cows according to the productive status is also a crucial production practice that drive profitability. Low cost producers tend to pay more attention to addressing the feed/nutritional needs of various groups within the herd (i.e. first calvers, mature cows, etc.) providing more opportunity to target animal nutrient needs. Feeding the entire herd as one group instead of feeding in separate groups results in managers targeting the 'average' cows' needs and often leads to over-feeding, under-feeding and waste of feed all at the same time, according to Kalie (2004).

On the other hand, feeding cows in separate groups could result in higher labour costs, more fence to build and maintain, and more management expenses. It is important for producers to find the balance between meeting the cow herd's nutrition needs and controlling additional costs.

As forages can vary wildly in nutritional quality from year to year and even within the same field. **Feed testing** enables producers to make informed management decision and optimize animal performance. Near infrared reflectance (NIR) spectroscopy is a rapid, reliable, low-cost, computerized method to analyze feeds for their nutrient content.

Knowing the exact nutrient contents allows producers to match feed quality with the animals' needs. It can also help reduce costs or generate additional profits by making the right decision on buying or selling forage. If an operation produces high quality forage, while their animals have relatively lower nutrient needs - selling these high-quality forage and buying lower quality forage for winter feed could bring extra revenue.

Labour cost and labour efficiency is an important part of cost management. It was noted that cow-calf operations of similar size could have very different costs. For example, if a 300 cow/calf operation may have 1-2 employees, while another operation of the same size has 3-4 employees. This means labor cost per cow in one operation is two to four times higher than that of the first operation (Taylor and Field, 1995).

A study based on AgriProfit\$ data (Millang J., Key Success Factor in Cow Calf Enterprise Profitability) showed that total production costs, value of production, and total labour hours per cow are closely related to profitability. Specifically, labour hours per cow has an R^2 value of 0.267, meaning that 26% of the variation in profitability could be related to labour hours.

According to *agri benchmark* data, Canada has some of the highest wages in all major beef producing countries at US\$18-30/hour. A higher wage means that Canada must produce more tonnage of beef per labour hour than other countries to be competitive. This can be done with fewer hours or by producing more pounds through increasing labour efficiency or spreading the costs over a larger herd (This will be discussed later in the Economy of Scale section on Page 7).

In Canada, the measure of physical labour productivity ranged from 29-64 kgs live weight per hour. This is slightly higher than 26-49 kgs in the US, but lower than the 41-174 kgs live weight per hour in Australia.

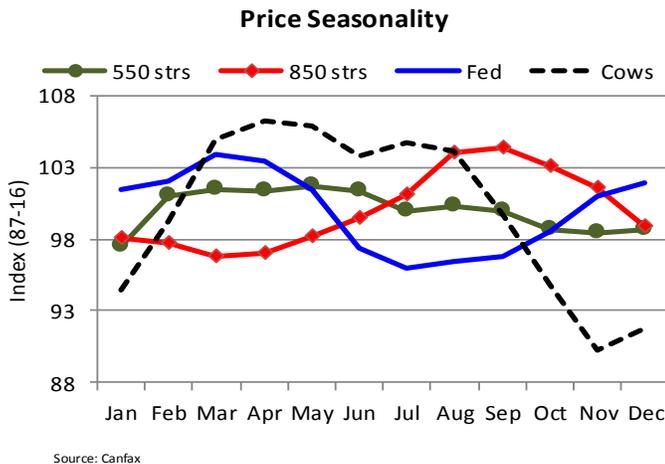
3. Marketing Strategy

Having a marketing strategy, meeting market specification, and using risk management tools were some of the

practices identified as areas that are underutilized and have potential of improving competitiveness. A marketing strategy plays a key role in profitability as it identifies the breakeven price for every group of cattle and encourages producers to be disciplined in selling. Selling cattle without a clear strategy and goal may result in lost income opportunities selling cattle at less than desirable price level. Using the five-year (2012-2016) average calf prices, and assuming a 90% calving rate, the difference in total revenues between selling at annual low vs. annual average is estimated at nearly a \$3,000 for a 100-head cow herd.

Table 2. Selling at Annual Low vs. Annual Average Price

Calf Prices	# of calves	Total Revenue
Annual Low - \$212/cwt	90	\$104,940
Annual Avg. - \$218/cwt	90	\$107,910
Difference		\$2,970



A good selling strategy is not just topping the marketing with the highest price and highest weight, other factors such as production costs, opportunity costs, and price slides should also be considered.

For example, at culling time, producers have the options of either to sell cull cows immediately, overwinter the cows with the rest of the herd and sell them in spring in anticipation of increased cow prices, or separate and feed them a high grain diet before sale. Depending on current price trend, winter feeding costs, and cow performance, the result of these marketing options could be different every year and for different producers.

Opportunity costs is a factor that is often overlooked when producers make marketing decision. For example, when it comes to selling or keeping a breeding heifer, in addition to the cash value of the heifer, it is important to consider

the net present value of the potential returns from the calves this heifer may produce based on COP and expectation of calf prices.

In general, the key is to explore various pricing strategies, and compared the pros and cons of alternative marketing methods based on current market situations.

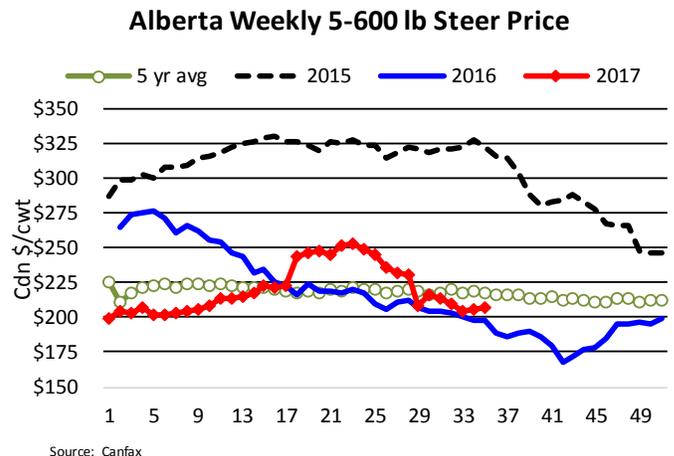
4. Marketing Channels and Market Specifications

Profitable cattle marketing is not only about getting the highest price, but also about choosing the market that is most suitable and profitable for the cattle, and producing cattle to consistently meet market specifications for the target market.

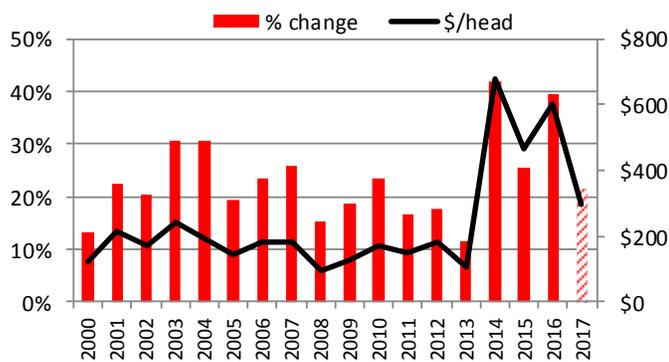
This is especially true for producers who target at niche markets. As production costs for these products are typically higher, it is important to choose the right marketing channels that provide premiums. Raising cattle at a higher cost targeting a specific market, but fail to meet the specifications and end up selling them at conventional channel was reported as one of the reasons for the poor margins of the least competitive producers.

5. Risk Management

Beef producers are exposed to market risks caused by unexpected change in market prices. The last few years have been a roller coaster ride for the cattle market with big swings in prices and profitability. In 2016, 550 lb calf prices moved from \$277/cwt to \$168/cwt, this equates to a \$600 per head change in value. So far in 2017, the price has dropped from \$253/cwt to the current low of \$202/cwt, which is a \$280 per head decline. The large swings in prices have created volatility in potential profitability, and makes it challenging for producers to manage the market risks they face.



AB Calf Price Change - Low to High



Source: Canfax

Risk management is about protecting equity. Tools that are available for price risk management include price insurance, futures hedging, electronics sales with forward delivery and contracting.

Price insurance is a risk management tool that allows producers to lock in a floor price, while taking advantage if prices move higher. In Canada, the Western Livestock Price Insurance Program (Western LPIP) is available in British Columbia, Alberta, Saskatchewan, and Manitoba.

For calves, insurance is available to purchase between the start of February and the end of May for coverage between September and December. The settlement index is based on the average price of a 600 lb steer.

The feeder insurance is available to purchase year-round except holidays; but there are no settlements in June, July as there is not a sufficient volume of feeders to generate a settlement index. The feeder insurance coverage and settlement is based on the average prices of an 850 lb steer. For calves and feeders, prices insurance coverage and settlements are based on two separate markets. One is combined Saskatchewan and Manitoba insurance price, while the other is mainly Alberta prices.

Fed cattle insurance is available to purchase year-round except holidays, and the settlement is based on a finished animal at the Canfax fed cattle price.

Using **futures** contracts can protect against major swing in prices, but capital requirement for hedging activities can be high and producers have to be aware of exchange rate and basis risk.

The use of **forward contracting** is commonly used between feedlot and packers, and cow-calf producers are beginning to explore this option. Producer can use forward contracting to set prices months before delivery and eliminate the downside risk of the market, but it also

removed the opportunity to taking higher prices in the cash market.

For producers, it is important to know the market value of their cattle and their risk tolerance, identify and understand the risks they face, and explore all available options to determine the best solution for risk management. More information about marketing options and risk management tools can be found at the [CRS Fact Sheet: Marketing Calves & Culling Cows](#)

B. REPRODUCTIVE EFFICIENCY & GENETICS

Reproductive efficiency has a large impact on cow-calf profitability. According to Alberta Agriculture's AgriProfit\$ 2011 data low-cost producers have a higher conception rate (90.9% vs. 88%), higher calving rate (98.3% vs. 97.7%), higher weaning rate (97.3% vs. 96.2%), and calf crop percentage (86.7% vs. 82.5%) in their herds compared to the overall sample. Having a good reproductive evaluation and control strategy is a key for high levels of reproductive efficiency.

The productivity of beef cows depends largely on the amount of fat they carry. A herd of cows maintained in the right condition with an ideal layer of fat cover will have more calves than a herd of thin or over-fat cows. **Body condition scoring (BCS)** is a low cost, hands-on method to determine the condition (amount of fat cover) of cattle. According to the Western Canadian Cow-Calf Survey (2014) only 19% of respondents regularly BCS their cows.

Research has shown that up to 46% of cows in Western Canada may be copper deficient. Cows with blood copper levels below 0.4 ppm prior to breeding are at increased risk of not becoming pregnant, particularly young cows less than four years of age. Therefore, having a **year-round mineral program** is also crucial for ensuring higher reproductive performance.

Proper selection and culling of individual animals supports ongoing genetic improvement in the herd and profitability. A clear **culling strategy** also supports reproductive efficiency as the most reproductive animals are kept. Tracking reproductive performance of individual cows, culling defective, low-producing and older cows can help improve overall herd reproductive rates and reduce per unit production costs.

Managing first-calf heifers is a key aspect in ensuring high reproductive efficiency as these young breeding females represent the future genetics of the cattle herd and profitability of the operation moving forward. The physical

and nutritional stresses associated with parturition, lactation and continuing her own growth, create a challenge for the first-calf heifers. Close attention during calving, providing good quality nutrition, separate management from mature cow herd, weaning calf from first-calf heifers early, and monitoring BCS are some of the practices recommended in managing first-calf heifers.

In terms of **genetic selection**, bull selection, maternal traits and calving ease are traits that drive profitability through labour costs and animal performance.

When it comes to selection for cow reproductive efficiency, there has been a trend of producing heavier cows, as heavier cows tend to produce heavier calves. However, weaning weight as a percentage of mature cow weights at 43% in 2013-15 was below the average in the late 1990's at 44% in Alberta, but above the low of 42% in 2005-07.



Source: Alberta Agriculture and Forestry AgriProfit5

If cow size increases without the corresponding increase in calf size, it would mean a higher COP and lower margin. On the other hand, if a producer can reduce cow size without negatively impacting calf weight, it will positively affect profitability. Based on the 2012-2016 average, the estimated COP per 1200 lb cow at \$684/cow is 15% lower than the a 1500 lb cow at \$772/cow. If these cows produce calves with the same weaning weight (550 lb), the net return of the lighter cow would be \$88 or 23% higher the heavier cows, assuming calf prices at \$2.10/lb.

Table 3. Potential Economic Impact of Weaning Weight as a percentage of Cow Weight

Cow Weight	Weaning Weight	COP (\$/cow)	Calf Prices (\$/lb)	Net Return (\$/cow)
1200 lb	550 lb	\$684	\$2.10	\$471
1500 lb	550 lb	\$772	\$2.10	\$383
Difference				\$88

While *weaning weight as a percentage of mature cow weight* is an important productivity measure for cow/calf producers, from a profitability stand point, it is important to ask whether the potential increases in weaning weight and salvage value from larger cows offset the costs of increased feed and decreased carrying capacity, and select cows that are the best fit for their environment, available resources and marketing strategy will optimized efficiency and improved profitability (Schmid, 2013).

Despite the importance of reproductive efficiency, improving reproductive efficiency may require addition labour, time and investment. It is important to find the balance between improving reproductive efficiency and the associated addition costs (e.g. labour, feed and veterinary costs). If the cost of increasing reproductive efficiency is high, the increased revenue may not be able to offset the additional cost (Table 4).

Table 4. Gain/Loss of Improved Reproductive Efficiency

Calving Rate	Extra Cost	COP (\$/cow)	Calf prices (\$/lb)	Total Net Return	Δ in Net Return
90%	--	\$684	\$2.1	\$35,550	--
92%	1%	\$691	\$2.1	\$37,160	\$1,610
92%	2%	\$698	\$2.1	\$36,460	\$910
92%	3%	\$705	\$2.1	\$35,760	\$210
92%	4%	\$711	\$2.1	\$35,160	-\$390

Assumptions: # of cow = 100, weaning weight = 550 lb

C. ANIMAL HEALTH

Sickness of cows and calves is very costly for cattle producers as it causes lower reproduction rates, reduced weight gain, poor feed conversion, and high health treatment costs.

Vaccination is considered as one of the production practices under the animal health category that make the biggest impact on profitability. While the cost of vaccination might be high, healthy breeding stock means more calves to market each year. Vaccinating calves can ensure they have reduced risk of getting ill, which reduces treatment costs, mortality rate, and increases growth performance and weaning weight. For example, bovine viral diarrhea (BVD) is estimated to cost the Canadian cattle industry \$78-220 million per year (BCRC, 2016). The cost of a whole herd vaccination program for BVD virus in a 150-head cow herd is estimated at \$8.20 per cow (assuming \$4 per vaccine dose). If that herd wasn't vaccinated and ended up with a persistently infected (PI) calf and 5% decreased

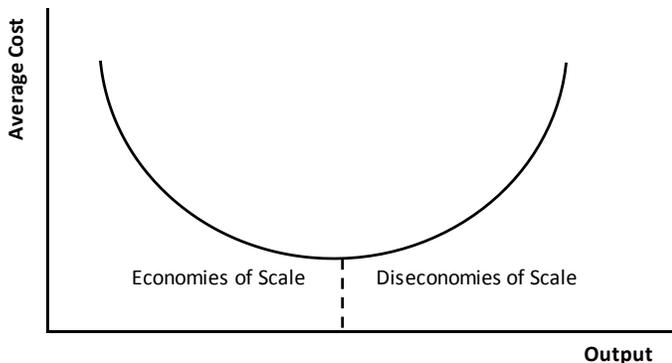
conception due to BVD, they would suffer a loss of \$45 per cow across the herd (Larson, 2017).

Parasite control can help reduce stress from parasite burdens and improve vaccination response. Strategically dewormed cattle can improve feed efficiency, improve reproductive performance, maintain better body condition scores, and possess stronger immune systems. Timing parasite control application based on the season can help make the most use of animal health investment.

D. ECONOMIES OF SCALE

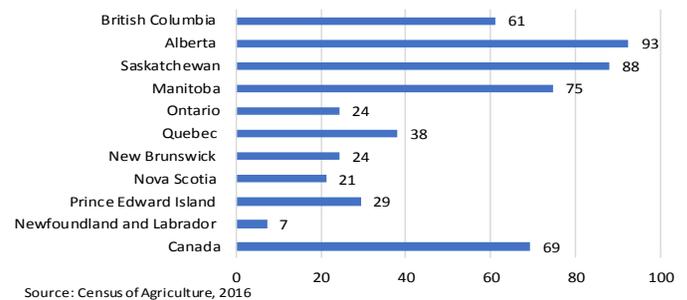
Economies of scale are the cost advantages that enterprises obtain due to size, output, or scale of operation, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output. For cattle producers achieving economies of scale means increased labour productivity and capital efficiency, and ultimately improved profitability.

Diseconomies of scale can exist in the cow-calf sector. Research has also shown that per unit cost of production declines at a decreasing rate as herd size increase. This means that when the herd size exceeds the optimal levels, any increase in size could lead to higher per unit costs. If the maximum labour capacity of a farm is managing a 1,000-head cow herd, adding another 200 head of cows to the herd may require hiring additional labour, which could increase labour cost on a per head basis.



Unlike a grain farmer who can spend a few days on each parcel of land each year, beef producers need to check water, mineral, and animal health regularly. This dynamic makes it difficult for cattle farmers to rent multiple tracks that are not contiguous (CRS, 2014). The limitation in skilled labour supply and suitable land resource for cattle production will make herd expansion more difficult in the future.

Average Cow Herd Size, 2016



In Canada, herd size varies significantly across the country, ranging from 7 head in Newfoundland and Labrador to 93 head in Alberta. While expansion of smaller operations is often restricted by land resource, feed availability, labour, and other factors; diversification or developing complementary enterprises could help increase labour and capital efficiency. For large operation, the challenge is how to effectively allocate labour and other resources throughout the year, especially during the peak seasons of labour demand.

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Production/Management Practices that Drive Profitability

agri benchmark beef and sheep conference

June 20, 2017

Winter Barns (Cow-Calf)	Grazing Year-Round (Cow-Calf)	Supplemented on Pasture (Cow-Calf)
<ol style="list-style-type: none"> 1. Management of power machinery costs <ol style="list-style-type: none"> a. Use of owned machinery vs. contracted 2. Benchmarking – cannot control what you don't measure 3. Genetics <ol style="list-style-type: none"> a. Bull selection b. Maternal traits c. Calving ease 4. Grass management optimization <ol style="list-style-type: none"> a. Genetics, Rotational grazing, measurement 5. Feed analysis 6. Meeting Market Specifications <ol style="list-style-type: none"> a. Topping the market (heaviest calf at highest price but unprofitable cost structure) b. Organic weaned calf production with no premium 7. Clear culling strategy <ol style="list-style-type: none"> a. Keeping non-productive cows too long 	<ol style="list-style-type: none"> 1. Reproductive evaluation and control 2. Animal Health 3. Feeding according to reproductive status 4. Controlling the calving season (63 days) 5. Clear culling strategy 6. Planning feed strategy according to the breeding cycle 7. Lack of biosecurity 8. Genetic strategy 9. Attention to rearing period for heifers/ heifer development 	<ol style="list-style-type: none"> 1. Reproductive Efficiency <ol style="list-style-type: none"> a. Body Condition Scoring b. Mineral program year-round c. Culling unproductive cows d. Managing first calf heifers 2. Winter Feeding <ol style="list-style-type: none"> a. Utilization of forage throughout the grazing season b. Extending the grazing season c. Use of alternative feeds 3. Animal Health <ol style="list-style-type: none"> a. Vaccination program b. Parasite control (fly control) and timing of application 4. Feed testing <ol style="list-style-type: none"> a. Water testing b. Access to clean water 5. Record keeping/Benchmarking <ol style="list-style-type: none"> a. Understanding opportunity cost of unpaid labour and labour efficiency 6. Genetic selection <ol style="list-style-type: none"> a. Weaning weight as a percentage of mature cow weight 7. Pasture Management <ol style="list-style-type: none"> a. Invasive Species 8. Risk Management <ol style="list-style-type: none"> a. Marketing plans - Price Insurance, Forward Contracting, etc. 9. Predator Control
Silage Finished	Grass Finished	Grain Finished
<ol style="list-style-type: none"> 1. Management equipment costs <ol style="list-style-type: none"> a. Use of owned machinery vs. contracted 2. Benchmarking performance and costs 3. Weighing – Average Daily Gain <ol style="list-style-type: none"> a. Optimization of ADG and cost of feed ration for marketing farm resources 4. Feed Analysis <ol style="list-style-type: none"> a. Quality of on-farm production & purchases 5. Rumen Management <ol style="list-style-type: none"> a. Stable & balanced feed regime 6. Market Specifications <ol style="list-style-type: none"> a. Have a marketing strategy other than topping the market with the highest price and highest weight 	<ol style="list-style-type: none"> 1. Management capacity <ol style="list-style-type: none"> a. System controls b. Making informed decisions 2. Grassland management <ol style="list-style-type: none"> a. Rest & Graze b. Fertilizer Mgt. c. Fencing 3. Calving Time <ol style="list-style-type: none"> a. Matching available feed source b. Meeting market price signals c. Genetics 4. Record keeping & Planning <ol style="list-style-type: none"> a. Herd movements b. Financial planning 5. Time Management & Organization (Labour) 6. Adapting to changing environment <ol style="list-style-type: none"> a. Risk management b. Timely decisions 	<ol style="list-style-type: none"> 1. Cost of Feeder (buying decisions) <ol style="list-style-type: none"> a. Use of steers/heifers b. Weight categories c. Managing margins 2. Cost of Feed <ol style="list-style-type: none"> a. Use of by-products and alternatives b. Custom work vs. owned equipment c. Selling good quality crops and buying lower quality 3. Animal Performance <ol style="list-style-type: none"> a. Feed Efficiency b. Average Daily Gain c. Monitoring & adjusting feed rations 4. Animal Health <ol style="list-style-type: none"> a. Vaccinations b. Parasite control (GIN/Flies) 5. Feed Testing <ol style="list-style-type: none"> a. Ration development b. Use of alternative feeds 6. Risk Management <ol style="list-style-type: none"> a. Marketing strategy b. Use of hedging, forward contracts c. Meeting market specifications