CRSB Research Priorities & Recommendations

updated July 4, 2017

Background

The Canadian Roundtable for Sustainable Beef (CRSB) published the first National Beef Sustainability Assessment (NBSA) in October 2016. The CRSB intends to update the NBSA every 5-7 years, with the next iteration being delivered in 2023 to allow for substantial data updates and address research gaps. An interim report with updates on the metrics coming from outsides sources is recommended for 2019. In order to improve the next NBSA several research and data gaps have been identified that need to be filled before the next iteration starts.

There are some recently completed and in-progress efforts (i.e. funding applications being reviewed) already underway. In addition, some of the recommendations have broader scope than the beef industry alone (e.g. corn life cycle inventories, farm safety, and food waste). To further these broader research areas, support from the beef industry research efforts may be needed, however it may be more appropriate for another segment of the agriculture industry to take the lead in funding and delivery.

	7 year (2021-23)
Ecotoxicity risk in Canada (excluded in 2016)	BCRC
Corn LCI	CRSC
Soybean LCI	CRSC
Hay LCI	√
Phosphorus excretion rates	
Erosion	
Biodiversity WHAFI	√
LCA biodiversity methodology	?
Carbon Sequestration	?
Research & Adoption of RMP around feed rations & manure management	√
Water methodology (Net Blue)	√
Blue/Green water interaction - *% of irrigation used for beef feed*	√
Canadian food waste numbers	

The research priorities from the NBSA are outlined below. They are grouped together under the pillars of environment, social and economic.

NBSA 2016 EXCLUSIONS

There were a number of areas excluded from the NBSA, 2016 due to data limitations or because they were deemed out of scope by the steering committee.

Beef production from the dairy was out of scope for the 2016 NBSA, as contribution was deemed small (i.e. 14-17% of total Canadian beef production). In addition, the Environmental Footprint work by BCRC/AAFC included the dairy industry. The decision to exclude dairy will need to be revisited when the NBSA is updated.

A range of impacts cannot be assessed through the current LCA methodology (whether environmental or social) and therefore excluded from the 2016 NBSA.

- Development of **antimicrobial resistant** micro-organisms in beef production systems.
- **Ecotoxicity**: Impacts of residual hormones and antibiotics potentially released into the environment on human and ecosystem health. However indirect impact of the use of GET and antibiotics is considered in this study, given their influence on performance relative to key parameters such as the number of days on feed, weight intakes, or reduced mortality rates.
- Effects of the usage of **mono-culture**/GMO/large spectrum pesticide (e.g. on biodiversity, bee populations, etc.).
- Effects of different breeds of cattle.
- Impacts of meat consumption (compared to recommended amount by Canada's Food guide) on **human health**.
- Embedded historical environmental and social impacts. A historical perspective, while important in both social and environmental aspects (land privatization, fencing, First Nations removal by colonial settlers, etc.) is out of scope.
- The assessment of impacts at the **global scale** (e.g. climate change knock-on effects) is excluded from our system boundaries.

Recommendation: Eco-toxicity is a potential concern that needs further research in Canada to determine the current impact on the environment (e.g. water quality, biodiversity).

Environmental Assessment

Life Cycles

Research Priority: Support the development of Canadian feed life cycle inventories (LCIs) for corn, soybeans and hay.

For major feeds (barley, corn, wheat, oats, canola and peas) Life Cycle Inventories (LCIs) previously established for Alberta were used in the NBSA (Alberta Agriculture and Forestry, 2014). When unavailable, LCIs from other databases (i.e. EcoInvent or Agri-footprint) were adjusted or used as proxies (e.g. screening pellets, French triticale, Swiss alfalfa hay). The LCIs used for corn, soybeans and hay were not representative of Canadian production (see Table 2.23 NBSA Environmental and Social Report).

For hay, a sensitivity analysis was performed based on the work of Wiens et al. (2014), which revealed a negligible change in carbon footprint of beef production. However, the influence of Canadian farming practices for corn and soybean production could not be tested for lack of available data. Having Canadian data for these feed crops could improve the results, especially for corn which can be fed in large quantities in the east.

The 2018 Farm Management Survey (FMS) will have a perennial forages component that should address some of the data gaps for a hay LCI. A Canadian hay LCI needs to include the potential of perennial forages used in annual crop rotations on mixed farms with differing longevity of stands (e.g. 4 years vs. 10-20 years before rejuvenation).

- Matthew Wiens (UofM) Life Cycle Assessment of Alfalfa-Grass Hay Production in Manitoba. 2014.

- Susantha Jayasundara et al. 2014. Energy and greenhouse gas intensity of corn (Zea mays L.) production in Ontario: A regional assessment. Canadian Journal of Soil Science 94(1): 77-95. 10.4141/cjss2013-044.
- Quebec Grain Producers have a corn LCI (in French) that includes both carbon and water use.
- Pulse Canada and Stratus Ag Research conducted fertilizer management survey of Canadian farmers. Since fertilizers account for a majority of environmental impacts of crop production, existing life cycle inventory data could be updated with the results from Canadian fertilizer survey. A request for the data could be made to Denis Tremorin with Pulse Canada.
- The Canadian Roundtable for Sustainable Crops (CRSC) is working with Groupe Ageco (Jean Michel) on the carbon footprint for ten crops including corn and soybeans. This provides a solid base and could be expanded into full LCAs although that is not their intention in the immediate future.

Recommendation: Leave the corn and soybeans to the CRSC to expand existing carbon work into full LCA's (this may take more than 5 years). Ensure a hay LCI is completed with the 2018 FMS in time for the next NBSA.

Phosphorus

Research Priority: Improve understanding of phosphorus excretion rates that consider actual feed rations, particularly of grazing animals.

Phosphorus losses from manure excreted on pasture contributes to the greenhouse gas footprint of the beef industry as well as water quality (Freshwater eutrophication 5.8 g P eq per kg live weight). The NBSA used phosphorus excretion rates obtained from Statistics Canada, however these are rough estimates that do not consider the actual feed ration and are likely to be overestimated for grazing animals in particular cows, calves, and bulls. It should be noted that they might be underestimated for feedlot animals and while further refinement is recommended is not a significant contributor to the overall number.

Early evidence suggests that manure P has gone up in Ontario with the increased prevalence of corn distiller grains (DDGs) which generally have three times the P content of grain. Improving understanding of P metabolism as a consequence of the ethanol industry is warranted.

Research Priority: Update AAFC estimates for erosion on pastureland

Furthermore, the models implemented to assess phosphorus losses through run-off, leaching and soil erosion are not sufficiently representative of the Canadian context. Regional differences from rainfall, wind, and soil type; as well as differences between forages and row crops need to be accounted for.

Greenhouse Gases

Research Priority: Invest in research to enhance understanding of carbon sequestration, feed, innovations and productivity to reduce the overall GHG footprint of the Canadian beef industry.

Significant research investments have been made globally to understand the GHG footprint of the beef sector. Further opportunities for understanding of carbon sequestration potential remain as does further investment in how to reduce the GHG emissions through increasing productivity. Particular areas for further investment are outlined below.

- **Carbon Sequestration** – improving the understanding of the impact of land management on storage potential, regionalized values for soil cover, type and climate parameters.
- **Feed** - Improvements in feed quality, digestibility, and better matching protein supply to animal requirements will have meaningful impacts on reducing the GHG footprint of the beef industry.
- **Investment in research innovations** - (such as feed additives) that could significantly reduce the GHG emissions of the beef sector.
- **Improve productivity** - Future improvements in areas such as improvement of animal health and genetics that extend the productive life of animals, improve reproduction rates, increase productivity, reduce mortality rates, reduce the age of first reproduction, and reduce the prevalence of common diseases will all improve the GHG footprint of the beef industry.

Kim Ominski AGGP project (April 2017 to March 2021): 1) Animal field trials - Measurement of nutrient disappearance, fermentation parameters, digestibility, and methane production from treatment diets (in vivo) and animals fed treatment. 2) Manure and bedding management to decrease GHG emissions from solid manure and manure applied to soil bedding pack characterization - Measurement of cumulative N2O and NH3 emissions from packs, development of revised emission factors applicable to policy (May 2018 to May 2020) 4) Mineralization of organic N reserves associated with past manure application to N2O emissions from soil - Soil characterization, N2O emissions measured, development of revised emission factors applicable to policy, papers submitted for publication, BMP applications defined for technology transfer. Apr 2017 to Apr 2020. 5) Integration of diet, animal, and manure management strategies to reduce whole farm GHG emissions - Estimate whole farm emissions based on management practice, food choices, changes in diet quality and animal management associated with climate change.

Recommendation: Support research through BCRC's Science Cluster III to leverage current industry efforts.

Water Use, Efficiency, and Risk

Research Priority: Methodologies that take into consideration water cycling in efficiency measures and the relationship between the green and blue water footprints

In beef production, the vast majority of water use occurs during feed production, with 80% coming from irrigation. Any measurable reductions in water use, will need to focus on feed, grain crop breeding, agronomy, and irrigation delivery efficiency. Hence, this relies on the LCIs for barley, corn, and hay (see recommendations above). Validation of assumptions used around irrigated acres of feed grain production is needed. For example, is irrigated hay destined for the export and equine markets or for beef.

The NBSA assessed the gross blue water footprint of the beef industry in Canada. While comparable to other studies, this fails to consider that water cycles within the ecosystem. Water used for irrigation is not "lost". Methodologies that provide a better understanding of net blue water, while considering the relationship between blue and green water are needed.

Understanding of the water footprint and management of green water could enhance the understanding of the interaction of the beef industries green and blue water footprints. This could assist communication of ways producers can contribute to a lower water footprint through efficient irrigation systems, drought resistant crops and on farm management practices.

- The BCRC/AAFC Environmental Footprint Project - a literature review was published in the Journal of Animal Science. It describes and critically analyze approaches to quantify water use

in ruminant production; summarize and compare water use estimates of ruminant products from a range of studies; and identify and analyze possible strategies to reduce the water use of livestock products. This team is currently examining the impact of improvements in the Canadian beef cattle industry on water use intensity over the past three decades (1981-2011).

- The LEAP, UN FAO, organized a Water Footprint Technical Advisory Group to develop global guidelines on water footprint assessment of livestock products. The draft version of guidelines will be released for public review in 2017. The International Dairy Federation (IDF) is expected to release guidelines soon on water footprint of dairy production systems (Aung Moe, Alberta Agriculture and Forestry is a member).

Research Priority: Understanding the coping capacity of local water systems.

The NBSA's water risk assessment identified areas across Canada that have a higher risk for water shortages (i.e. drought) overlapped with higher beef cattle populations. In some cases, cattle are located there due to the drier climate supporting animal performance. However, it raised a potential concern. Understanding the coping capacity of local water systems to improve and manage shared water resources in areas with potential water scarcity and high cattle populations may be beneficial to avoiding future conflicts.

Recommendation: Utilize net blue water methodologies in the next NBSA. Include a summary of existing literature on the value of water filtration in the next NBSA (potentially addressed by an intern July 2017-February 2018).

Biodiversity

Measuring biodiversity is complex and methodologies are in their infancy. Models may include: land use/habitat change, health or quality of habitat provided (e.g. suitability, range or riparian health score), species richness, invasive species, etc.

Research Priority: Further refinement and improvements to the Wildlife Habitat Capacity of Farmland Indicator (WHAFI) developed by Agriculture and Agri-Food Canada (AAFC)

While there is more detailed biodiversity data available in some provinces (i.e. Alberta Biodiversity Monitoring Institute) the only national biodiversity data available was through the Wildlife Habitat Capacity of Farmland Indicator (WHAFI) developed by Agriculture and Agri-Food Canada (AAFC, Javorek et al. 2007, 2011). The *Habitat Suitability model* combines species geographical ranges, habitat preferences and environmental data to ID unsuitable habitat within a species range. It includes 587 species of wild terrestrial vertebrates in Canada in four different taxonomic groups (137 mammals, 370 birds, 42 amphibians and 38 reptiles). Each 30m grid of agricultural land cover was classified for each species as:

- **primary habitat** without this habitat the species cannot use the area
- **secondary habitat** species will use several habitat types for the same purpose
- **tertiary habitat** habitat not required, but species occasionally observed in it
- or **unsuitable habitat**

A habitat capacity matrix was then constructed for each terrestrial vertebrate species known to use agricultural land and adjacent habitats in Canada for one or more specific habitat requirements

(breeding, feeding, loafing, cover, staging and wintering). The WHAFI has mainly been applied to assess the impact of relative changes in land cover types on the wildlife habitat capacity of agricultural land in Canada at the SLC polygon level. In order to better reflect the impact of beef cattle production at a broader scale, it was customized for agricultural land at the provincial level. The average *habitat use values for breeding and feeding (Matrix Combined Values, MCVs)* of each land cover at the SLC polygon level were obtained. The average MCV of each land cover in each ecozone was then derived, since there was little variability among these values. These average *MCVs represent habitat capacity intensity values (capacity to provide habitat to various species per unit of surface)* calculated through the WHAFI methodology.

Further refinement and improvements to the WHAFI would contribute to a more robust understanding of the Canadian beef industries contribution to biodiversity on the agricultural landscape. Such refinements could include:

- Improve granularity of the analysis, by assessing breeding and feeding requirements for wildlife separately, and by considering taxonomic groups or endangered species separately.
- Differentiate biodiversity impacts between native and tame, improved, pastures, to allow a quantification of the contribution of beef production to the maintenance of biodiversity important native pastures.
- Account for management practices, since sustainable and grazing management practices can yield substantial biodiversity differences and benefits.
- Develop more specific policy scenarios, to support sustainable beef production (increase in the share of extensive beef production, impact of changes in beef rations on biodiversity).
- Broaden the approach, though LCA, models of ecosystem services or other types of biodiversity measures (e.g., an indicator of habitat connectivity or fragmentation).

Research Priority: Compare results from a Life Cycle Assessment approach to biodiversity in Alberta to the WHAFI.

The Environmental Footprint project by the Beef Cattle Research Council (BCRC) is developing a methodology for biodiversity using the LCA approach. This can be tested using the data from the Alberta Biodiversity Monitoring Institute (ABMI). A comparison between the results of this project with the WHAFI results in the NBSA would provide a degree of confidence in what is needed for next steps and where industry efforts should be made in either pursuing data in other provinces to support an LCA methodology or to continue enhancing WHAFI as a national indicator.

- ALMA project with Alberta Biodiversity Monitoring Institute (ABMI) and Danielle Maia de Souza
- Tim McAllister's team has applied to BCRC Science Cluster III for an expansion

Recommendation: Continue to explore methodologies in biodiversity to determine a single method that is the most suitable for Canadian conditions.

Food Waste

Research Priority: Invest in the collection of Canadian specific information regarding food waste, after the packers gate.

Meat waste occurring after the packers' gate is based on generic sources not specific to Canada (Canadian data was available but appeared less relevant to this context). More accurate and

representative data would help improve the overall quality of the results. This would also give a more accurate vision of the mitigation potentials and strengthen the key message to the concerned players (industrials, retailers, consumers) to reduce their environmental footprint.
Food waste costs Canada's economy $31-107 billion annually. Carbon pollution from organic material in landfills accounts for about 4% of the national total (Environment Canada) and food waste accounts for more than half of all organic disposed.
The Zero Waste: National Zero Waste Council reports that 47% of food waste occurs with the consumer, 20% at processing, 10% at retail stores, 10% on farm, 9% in restaurants and hotels, 4% during transportation and 1% international catering (Value Chain Management International, 2014). They have developed a National Food Waste Reduction Strategy (March 2017) that is built on three pillars: policy changes, innovation and behaviour change. They have recommended a national target of reducing food waste by 50% by 2030 to align with the US target and elevate awareness of the issue. In Canada, the responsibility for managing and reducing waste is shared among federal, provincial, territorial, and municipal governments.
In addition, the Department of Agriculture and Agri-Food has been charged with leading the development of a National Food Policy by 2019[1] in collaboration with Health Canada and Environment Canada. Concerns about methodology for Food waste calculations have been raised recently and consensus needs to be reached at a higher level than just red meat[2].

Recommendation: Leverage reporting by the National Food Waste Council on their national target to fill the gap for Canadian food waste data.

Social Assessment

Work Load

Research Priority: Advance understanding of factors driving work load, implications of high work load and identification of economically viable management practices that could reduce work load.

Producer work load was identified as a hotspot at cattle operations, however, the economic assessment showed that producer viability and the industry characteristics may be a result of this phenomenon due to potential pressure to increase or at least maintain a certain level of productivity and profitability that may require greater work load than what is commonly observed in other industries.

Nonetheless, this may pose health and safety risks due to lower reactivity or awareness for instance. Further understanding of the factors driving work load (e.g. labour availability, off-farm work, etc.), implications of high work load (i.e. farm injury and fatality) and identification of economically viable management practices that could reduce work load (i.e. adoption of technology) are recommended.

- The Young Rancher's Study outlines a number of financial pressures for producers entering the business face and the associated work load.
- Sudarma Samarajeewa, Getu Hailu, Scott Jeffrey and Maury Bredahl. (2012). Analysis of Production Efficiency of Cow/Calf Farms in Alberta. Applied Economics, Volume 44, Issue 3, 2012.

[1] https://foodsecurecanada.org/resources-news/news-media/national-food-policy-primer#1
[2] https://academic.oup.com/ajae/article/3868245/On-the-Measurement-of-Food-Waste#authorNotesSectionTitle

Health and Safety

Research Priority: Support the monitoring of farm health and safety

Although health and safety prevention indicators show good results at the operational level, our limited sample did not enable us to measure meaningful incident rates. Because farmers' workload is high, this incident rate should be monitored regularly.

Farm injury/fatality statistics in Canada are reported through the Canadian Agricultural Injury Report[3] and Farm Safety Centre; including animal related fatalities. Agriculture ranks as Canada's third most hazardous industry. Agricultural machines were involved in 70.9% of fatalities. Many of these injury incidents are preventable. Having a better understanding of where these injuries occur, particularly in the beef sector is needed to inform communication efforts.

The mental health needs of veterinarians and agricultural producers are being increasingly recognized worldwide. Veterinarians in the United Kingdom, Australia and United States experience higher levels of anxiety, depression, burnout and stress than the general population. Death by suicide in veterinarians in the UK and Australia are approximately four times higher than the general population. A similar picture exists for agricultural producers. Even during relatively calm, producers worldwide experience a wide range of occupational stresses many of which are beyond their control. These include: weather, government regulations, disease, financial burdens and succession planning. This is amplified during times of agricultural emergency and disease outbreaks. Dr. Andrea Jones-Bitton, University of Guelph OVC led a survey of 398 Ontario veterinarians (July to September 2015) and a national survey of 1,132 agricultural producers (September 2015 to January 2016). Approximately 45% of surveyed producers were classified as high stress. Surveyed producers had favourable attitudes towards help for mental health. Over two-thirds of producers indicated that seeing a mental health profession can be helpful; unfortunately, 40% said they would feel uneasy seeking professional help due to perceived stigma. The level of satisfaction with industry support for mental health among Canadian livestock industries (dairy, beef cattle, sheep, goats, pork and poultry) was just 12-60%. Future direction for producers include development of a mental health literacy program specific for Canadian agriculture and development of an emergency response model to facilitate quick and efficient response to producer wellbeing during times of agricultural crisis.[4] Final results of the survey are unavailable at this time.

The National Farmers Union has a list of the mental health and crisis resources available in each province. The Western College of Veterinary Medicine (WCVM) has developed a Veterinary Social Work Imitative (Erin Wasson was hired in August 2015) the first of its kind in Canada. It's a groundbreaking program that provides social work support to a range of people at the regional veterinary college and its veterinary medical centre: animal owners, clinical faculty and staff, and veterinary students.

Recommendation: Continue to monitor research in this area and have CRSB make the current information in Canada available to all members.

[3] http://www.cair-sbac.ca/reports/cair-reports/current/

[4] https://www.realagriculture.com/2016/06/national-survey-shows-farmers-need-and-want-mental-health-help/

Animal Care

Research Priority: Monitor uptake of recommended practices regarding animal care

The NBSA showed positive results for animal care in the beef industry. However, the link between animal welfare and consumer demand should be explored in more detail to strengthen future communication and ensure good practices at the operational levels. Monitoring of the adoption of recommended practices is recommended.

- Current monitoring of recommended practices uptake includes the 2014 Western Canadian Cow-Calf Survey (WCCCS), the 2016 Ontario Cow/calf Survey (April 2017-March 2018), proposed Maritime Cow/calf survey, BCRC Monitoring Adoption of Innovation Survey.

Recommendation: Focus on communication and encouraging adoption of the Code of Practice.

Research Priority: Support investment in pain mitigation for painful procedures

The CRSB membership expressed support in the development of new methods to mitigate pain during painful procedures.

Research Priority: Advance monitoring of antibiotic use and responsible management.

Responsible antibiotic use and monitoring is a topic of concern for CRSB membership due to consumer interest in this area. CRSB supports the continued investment in monitoring and advancing the understanding of antibiotic use in the Canadian beef industry. Furthermore, understanding of recommended practices regarding antibiotic use may be a future need for CRSB membership.

- A white paper is being completed by the Global Roundtable of Sustainable Beef (GRSB) on antibiotic use and responsible management.
- CRSB should be kept apprised of the developments from the Canadian Veterinary Medicine Association (CVMA). The Canadian Veterinary Medical Association (CVMA) is has received funding to lay the foundation for the national surveillance of antimicrobial use. All antibiotics will require a veterinary prescription on January 1, 2018. Extensive beef cluster and earlier work largely funded through ALMA, BCRC, ABP, GRDA and led by AAFC Lethbridge (McAllister)

Recommendation: Review the white paper developed by GRSB.

Transportation is an ongoing issue, particularly with respect to time in transit, frequency and duration of feed, water, and rest stops. Current research is underway with ABP, BCRC/AAFC funding work with Karen Schwartzkopf-Genswein. Haley at the University of Guelph has done some work as well.

Economic Assessment

Cost of Adopting Recommended Management Practices (RMPs)

Research Priority: Assess economic feasibility and acceptance of recommended management practices (RMPs)

The NBSA provided an economic baseline from which to monitor continual improvement. However, it is recognized that there is interest in having a cost-benefit analysis (CBA) completed on the RMPs, from the environmental and social assessment by Deloitte, to help communicate implications of adopting various practices to producers.

RMPs for beef production systems are not always obvious (i.e. manure management, calf-fed vs yearling-fed, etc.), a cross analysis with technical and economic aspects would help assessing their feasibility and acceptance.

Natural Capital

Natural capital is the stock of ecological assets which provide a flow of goods and services that people value (Anderson et al. 2010). Beef producers steward large portions of agricultural land in Canada. This natural capital generates economic value in various ways. Canada's natural resource assets (e.g. timber, oil, natural gas and other subsoil minerals) have been valued by Statistics Canada at around $1 trillion. As the value of preserving and restoring ecosystems is being increasingly recognized, identifying and quantifying natural capital has become a part of environmental planning and management. The goal of providing hard data is that it makes tradeoffs explicit in policy models and fosters better informed public debate. The intention is that this would inform sustainable resource allocation and policy decisions.

Economic valuation of Ecosystem Services (ES) is the process of assigning monetary value to goods and services that are not normally marketed (Anderson et al. 2010). Several approaches and techniques have been developed to quantify ES values. However, ES valuation faces several technical challenges, including: (1) Identifying the relevant components – biodiversity inventory; (2) Social preferences are continuously changing – values will change; (3) Market prices can be poor estimates of value; (4) Ecosystem stability is complicated; and (5) Double counting issues (Daily 1997 and Anderson, J. et al. 2010).

While CRS recognizes the importance of the capturing the value of the natural capital that the Canadian beef industry stewards, valuations in this area are still unclear. Wider consensus on methodology and acceptance is needed in this area before adding to future assessments.

Recommendation: Ducks Unlimited has research in this area that could be incorporated in the next NBSA.

Niche Markets

Research Priority: Estimate existing Canadian production of niche market attributes, the potential size of these markets and premiums associated with them to assist CRSB membership and producers in making decisions to participate or not.

It should be noted that with limited production and sales data for Canada's niche beef markets, information on the premiums available for certain attributes is just as limited for the producer to make these decisions. In addition, there is limited literature on the cost of producing specific attributes.

Additional research is needed on the size and scope of niche markets and the premiums they can support. Information gaps include:

- Understanding how much of Canadian beef is in niche markets with labels including: Verified Sustainable, environmentally friendly (e.g. reduced carbon emissions), hormone-free, antibiotic-free, beta agonist-free, organic, or grass-fed.
    - What has been the annual growth of these labels over the last 5-10 years
    - What is the potential for further growth over the next 5-10 years
- Understanding the distribution channels for niche products in the domestic market (e.g. retail, foodservice, farmer's market, butcher, direct with producer, etc.)

Recommendation: Wait for direction from the marketing committee

Support for Technology Transfer

Research Priority: Invest in technology transfer that supports the uptake of recommended management practices

The CRSB recommends continued and increased investment in tools and programs that enable the development and sharing of recommended practices that advance the social, environmental, and economic sustainability of the beef industry. Closing the gap between high and low performers within the Canadian production system will have meaningful impact. Specific areas surrounding increasing production efficiencies, rangeland health management, farm safety and animal care were identified as being high priority.

Recommendation: Support ongoing and existing efforts by industry.

Conclusion

The above research recommendations will ensure future iterations of the National Beef Sustainability Assessment are more robust and informative to drive continuous improvement. Questions arising out of the above recommendations can be directed to Brenna Grant (grantb@cattle.ca).