Canadian Beef Advisors – Industry Goals to 2030

Updated February 19, 2025

Greenhouse Gas and Carbon Sequestration Goals

These goals are not presented in any particular order:

- Safeguard the existing 1.5 billion tonnes of carbon stored on lands managed with beef cattle[1]
- Sequester an additional 3.4 million tonnes of carbon every year[2]
- From 2014 to 2030, reduce primary production GHG emission intensity by 33%[3]
- Reduce food loss and waste (from secondary processing to consumer) by 50% by 2030

Context

Projections for climate change include greater frequency of extreme weather conditions that will impact agricultural production and the ability to maintain current productivity levels, let alone see incremental increases. Questions have been raised about how agriculture is responding to these changes in terms of readiness, resilience and adaptability. The beef industry wants to be part of the climate change solution. We are doing our part in addressing climate change, while also showcasing the benefits of beef production.

In setting these goals industry is aiming to build government and public support for beef production and its activities through a clear consistent message that addresses the challenges faced head on while also communicating its benefits.

How the goals could be achieved

It is recognized that these goals require contribution from all stages of production. Reaching these goals requires the commitment of producers including cow-calf, backgrounding, finishing and beef processing, through to the retail and foodservice sectors to measure and monitor progress. The table below provides key drivers that can contribute to achieving the various goals, based on where historical gains have been made. It is important to recognize that some drivers may have diminishing returns influenced by biological limits and the opportunities for acceleration in areas of research, technology and adoption of different practices throughout the supply chain. The areas with the largest potential are: food waste, feed efficiency, barley yield, and soil organic carbon.

Reproductive Efficiency	Hay Yields	Carbon Sequestration
Increase adoption of: • vaccinating cows • mineral programs • matching **nutritional** needs with rations - using precision nutrition in developing winter feed rations for cows. • Grazing management has the potential to improve cow body condition • Bull management (breeding soundness examinations)	Increase adoption of: • Stand rejuvenatation • use of grass/legume stands • fertilization • new varieties	• Sequester carbon on all the tame pasture and hayland at half the historical rate. • Grazing Management • Soil Health

[1] CRSB NBSA, 2016. This was updated in the CRSB NBSA, 2024 to 1.9 billions tonnes (note this is a recalculation not a 0.4 billion tonnes accumulation of carbon.

[2] Calculated from the CRSB NBSA (2024) 7.14 million tonnes of carbon were sequestered per year.

[3] Functional Unit: kg CO_2eq per kilogram of packed boneless beef, delivered and consumed. See Table 10 of the Groupe AGECO final report. CRSB NBSA, 2016.

Feed Efficiency	Feed Grain Yields	Food Waste
Driven by: • Genetics • Genomics • Feed Additives • Feed Processing • Feedlot management	Driven by: • **new varieties** becoming available • precision agriculture	• Evaluating losses throughout the supply chain. • Recognizing that reducing waste has no downsides. • Addressing food labelling and consumer education.

Parameters used in the Major Breakthrough Scenario achieved a 33% reducing in primary production GHG emission intensity.

Parameter	Baseline (2013/14)	2030p using Historical Trends	2030p with a Major Breakthrough
Reproductive Efficiency*	90%	87%	92%
Hay yield (tonnes/acre)	1.82	1.90	2.00
Barley yield (tonnes/acre)	1.60	2.52	2.65
Corn yield (tonnes/acre)	3.90	5.50	5.78
Feed efficiency**			
East	6.25	5.72	5.00
West	7.14	6.71	6.00
Steer Carcass weight (lbs)	875	925	950 ƚ

**July 1st calves under one year old as a percent of beef and dairy cows*

***Unit of dry matter intake per unit of live weight gain in feedlot cattle, (e.g. 6.25:1)*

ƚ The long term average increase in carcass weights of 6.6 lbs per year would suggest 975 lbs could be reached by 2030. But the most recent five year average (2013-18) has been slower at 4.2 lbs per year putting it at 946 lbs by 2030. This lower rate was used as there are pressures on technologies currently available. Until trade barriers are addressed or an alternative developed a slower annual growth rate is expected.

FAQs

Q: **Is there scientific literature that supports these goals?**

A: Alemu et al (2017) found improving management can reduce emission intensity by 31% on Canadian cow-calf operations. The functional unit of this study was per kilogram of beef live weight at the farm gate and is not comparable to the scenarios completed for primary production that were in per kilogram of beef delivered and consumed.

Q: **There is a lack of clear science on carbon sequestration, how was that addressed?**

A: The scientific literature around carbon sequestration rates in northern temperate grasslands that are grazed have been linked with increases, decreases and no change in soil carbon. The lack of conscensus reflect the small number of studies which fail to capture the full range of conditions found across grasslands and differences in methodologies. Establishing links between grazing and soil carbon sequestration is difficult due to the complexity of factors involved and may need better data on historical grazing management.

A meta-study covering 70 years reported Canadian grasslands to be a net carbon sink in the top 15cm at a rate of 190 kg/ha/yr (Wang et al. 2014). Naturalization of 2.3 million hectares of previously cultivated grasslands after 1930 contributed to this; but has likely abated as the pool has saturated. It is estimated that it takes 70 years to restore carbon back to native levels. Net Soil Organic Carbon (SOC) change and SOC change rates have dropped to zero in recent years, suggesting the finite potential of soil carbon sequestration in Canadian grasslands (Wang et al 2014, Lal 2004).

Research has found that non-degraded grassland soils have not reached equilibrium and continue to sequester carbon in Europe (Soussana and Lemaire, 2014). Continued rates of carbon sequestration have been primarily attributed to grazing intensity; lower utilization with reduced livestock numbers (Chang et al 2016). Continential U.S. grasslands had an average sequestration rate of 180 kg/ha/yr in the early 2000's and are projected to remain a sink, but at a lower rate of 80 kg/ha/yr (down 55%) going out to 2050 (USGCRP, 2018). A study in Alberta of four farms showed SOC rates of 0-2.4 tonnes/ha/yr under AMP and continuous grazing at various stocking rates. The carbon sequestration rates varied on soil types with all AMP grazing occurring on tame pasture where the sequestration was the highest, while native pasture with continuous grazing was zero.

If the historic rate in Canada of 190 kg/ha/yr is reduced by 55%, matching the US projection, this would provide 85.5 kg/ha/yr of carbon sequested over 10.7 Mha of tame pasture and hayland (COA 2016) for 923,000 tonnes of carbon or 3.4 million tonnes of CO_2eq. The rate was only applied to tame pasture and forage acres, as native pasture in good condition is expected to be at, or close to equilibrium.

Q: **How will carbon sequestration gains be encouraged to stay permanent?**
A: We are aware that grassland sequestration can be variable depending on land management and that it can be more easily reversible due to a change in land use or management. In order to encourage permanence of this carbon storage avoidance of land conversion is addressed in the land use and biodiversity goals.

Q: **Why was a Carbon Neutral goal not set?**
A: Through scenario analysis with Groupe AGECO, a consulting company specializing in agricultural life cycle assessments, on the CRSB's National Beef Sustainability Assessment (2016), it was found that a carbon neutral goal was not realistic even while using the most ambitious assumptions. Given the industry concern that any goal set must be achievable it was deemed inappropriate to pursue this goal at this time.

Q: **Why was a Climate Neutral goal not set?**
A: The goals set were considered robust and addressed every aspect of the supply chain; making a climate neutral goal redundant. In addition, the United Nations defines Climate Neutral as having three steps. First, measure the emissions from the sector; second, reduce what you can, and third, offset the rest. The cost of offsetting emissions from the beef sector would act like a tax on beef; either discouraging production if paid by producers or discouraging consumption if paid by consumers.

Q: **Why was the traditional GWP100 used and not GWP*?**
A: The GWP*(global warming potential) accounts for the fact that methane is a short-lived gas, remaining in the atmosphere for 10-12 years. This means that as long as cattle inventories are stable or increasing at the same rate as emission intensity is decreasing, the amount of methane in the atmosphere is constant and not contributing to climate change. While this is a lesser known metric, the International Panel on Climate Change (IPCC) 2014 report indicates that emission metrics depend on value judgements and contain wide uncertainties. There are a wide range of metrics proposed in the literature with various advantages and disadvantages for each. The choice of metric can make a large difference with significant impact for specific sectors, regions and time periods.

Through scenario analysis with Groupe AGECO, the interpretation of GWP* was questioned, along with its acceptance in the political community. In order to accomplish the overarching outcome of setting a goal that communicated to the public (consumers and government) that the beef industry is a serious partner in Canada's overall environmental sustainability goals – choosing a lesser known metric was considered a distraction.

If GWP* becomes an internationally accepted metric, industry can revisit the decision to use it.

Q: **Why was only a primary production reduction goal set and not from farm to fork?**
A: The goal for primary production was separated from that for secondary processing, retail and foodservice to provide clarity on role and responsibility. A food waste target was set to focus efforts at secondary processing, retail and foodservice.

Q: **Was the cost of implementing these goals calculated?**
A: It was recognized that there are costs to industry in changing practices to achieve these goals. However, it was also noted that there is no downside to efficiency improvements, which support climate goals and industry productivity. Producers have historically adopted and invested in practices that are economical and provide value. Ongoing production efficiencies tend to be quickly adopted when they make economic sense to individual operations.

Historically incremental improvements have been made with a focus on production efficiencies and economic viability. When the entire system is considered, there are efficiencies and gains to be made that would benefit producers and the entire supply chain. In addition, investments maybe needed that lead to quality and improved economic outcomes.

Q: **Isn't land use change driven by annual crop (cereals, oilseeds, pulses, etc.) prices and urban sprawl?**
A: Regionally pressures for land conversion differ with eastern Canada experiencing greater pressure from urban sprawl. The ability to safeguard the existing 1.5 billion tonnes of carbon stored on lands managed with cattle is threatened by competing uses and the economic returns to annual crops versus beef production. If annual crop prices increase, it will be difficult to prevent further land conversion. This is the reason why emphasis is on encouraging a sustainable economy that values ecosystem services from grasslands (such as carbon sequestration) and provides a financial incentive for producers to maintain grasslands. This has the potential to account for some of the social benefits not currently being considered when evaluating the economic returns of annual crops versus beef production.

Q: **Why is food waste included - shouldn't we only set goals that are within our influence?**
A: The membership of the Canadian Roundtable for Sustainable Beef (CRSB) includes processors, secondary processors, retailers and foodservice companies that are able to influence improvements in food waste from secondary processing through to the consumer. So while food waste is outside the influence and direct control of producers, food waste goals are being communicated and addressed through the CRSB.

It is recognized that the entire supply chain is in this effort of reducing GHG emissions together and we are responsible for supporting each other through the value chain.

Q: **Is the food loss and waste goal realistic?**
A: The food loss and waste numbers in the NBSA, 2016 report show that total post-harvest food loss and waste equals 19% of production with 5% at processing, 4% at retail, and 10% at the consumer. Therefore, 47% of this food loss and waste is within the supply chain and can be addressed through improvements in efficiency.

The goal to reduce food loss and waste by 50% by 2030 is consistent with the Zero Food Waste Council's goal.

Update on Progress (February 2025):

- Safeguard the existing 1.5 billion tonnes of carbon stored on lands managed with beef cattle (CRSB NBSA, 2016)
    - This was updated in the CRSB NBSA (2024) to 1.9 billions tonnes (note this is a recalculation not a 0.4 billion tonnes accumulation of carbon.
- Sequester an additional 3.4 million tonnes of carbon every year
    - Calculated from the CRSB NBSA (2024) 7.14 million tonnes of carbon were sequestered per year.
    - There will get to a point where the soil is fully saturated.
- From 2014 to 2030, reduce primary production GHG emission intensity by 33%.
    - Functional Unit: kg CO_2eq per kilogram of packed boneless beef, delivered and consumed. See Table 10 of the Groupe AGECO final report (CRSB NBSA, 2016).
    - From 2014 to 2021, GHG emissions intensity was reduced by 15% on a per kg boneless beef consumed basis (CRSB NBSA, 2024). Industry is on track to meet the 2030 goal.
- Reduce food loss and waste (from secondary processing to consumer) by 50% by 2030 (National Zero Waste Council)
- The 2025-30 National Beef Strategy outlines the plan industry is following to achieve these goals with Status Updates reporting progress. The Canadian Roundtable for Sustainable Beef's National Beef Sustainability Assessment follows internationally recognized methodology for measuring and monitoring these goals.

For further information, go to: Beefstrategy.com

References:

Alemu, A.W., Amiro, B.D., Bittman, S., MacDonald, D., Ominski, K.H. 2017. Greenhouse gas emission of Canadian cow-calf operations: A whole-farm assessment of 295 farms. Agric.Syst.. 151:73-83. ISSN 0308-521X. https://doi.org/10.1016/j.agsy.2016.11.013

Canadian Roundtable for Sustainable Beef. (2016). National Beef Sustainability Assessment: Environmental and Social Assessments. Calgary, AB: Deloitte. Abbreviation: (CRSB NBSA, 2016).

Canadian Roundtable for Sustainable Beef. (2024). National Beef Sustainability Assessment: Environmental and Social Assessments. Calgary, AB: Groupe AGECO. Abbreviation: (CRSB NBSA, 2024).

Chang, J. Ciais, P., Viovy, N., Vuichard, N., Herrero, M., Havlík, P., Wang, X., Sultan, B., Soussna, J-F. 2016. Effect of clmate change, CO2 trends, nitrogen addition, and land-cover and management intensity changes on the carbon balance of European grasslands. Glob. Change Biol. 22:338-350. https://doi.org/10.1111/gcb.13050

COA 2016. Census of Agriculture, Statistics Canada.

Groupe AGECO, April 2020. 2030 GHG Scenario Assessment. Submitted to Canfax Research Services.

International Panel on Climate Change (IPCC) 2014 report

Lal, R. 2004. Soil carbon sequestration to mitigate climate change. Geoderma. 123:1-22. https://doi.org/10.1016/j.geoderma.2004.01.032

National Zero Waste Council. https://nzwc.ca/Documents/FLWpackagingReport.pdf https://nzwc.ca/focus-areas/food/issue/Pages/default.aspx

Soussana,J.F., Lemaire,G. 2014.Coupling carbon and nitrogen cycles for environmentally sustainable intensitifcaion of grasslands and crop-lievestock systems. Agric. Ecosyst. Environ. 190:9-17. https://doi.org/10.1016/j.agee.2013.10.012

USGCRP (U.S. Global Change Research Program). 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

Wang, X., VandenBygaart, A. J., & McConkey, B. C. (2014). Land management history of Canadian grasslands and the impact on soil carbon storage. *Rangeland Ecology and Management*, *67*(4), 333–343. doi: https://doi.org/10.2111/REM-D-14-00006.1