

INTERIM REPORT

NATIONAL BEEF SUSTAINABILITY STRATEGY



An update on industry-wide progress
towards the CRSB's sustainability strategic
actions and research priorities



MISSION: To advance, measure and communicate continuous improvement in sustainability of the Canadian beef value chain.

VISION: That the Canadian beef value chain is a global leader in environmental, social and economic sustainability, and part of a trusted and thriving food system.

PRINCIPLES OF SUSTAINABLE BEEF



NATURAL
RESOURCES



PEOPLE & THE
COMMUNITY



ANIMAL HEALTH
& WELFARE



FOOD



EFFICIENCY
& INNOVATION

← **ECONOMIC VIABILITY** →

SUSTAINABILITY

A JOURNEY OF CONTINUOUS IMPROVEMENT

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Abbreviation: (CRSB Interim Report, 2026)

EXECUTIVE SUMMARY

The Canadian Roundtable for Sustainable Beef (CRSB) is committed to advancing, measuring and communicating continuous improvement in the sustainability of the Canadian beef value chain. Through the National Beef Sustainability Assessment (NBSA), CRSB measures environmental, social, and economic sustainability performance approximately every seven years to track progress, identify emerging challenges and guide future actions. The second NBSA, released in 2024, evaluated progress between 2014 and 2021, and informed the CRSB Sustainability Strategy (2024–2030).

The 2026 Interim Report provides an update on implementation of the Sustainability Strategy. Drawing on submissions to the CRSB Projects and Initiatives Database, it highlights where the Canadian beef sector is making progress, identifies remaining gaps, and helps identify opportunities for future collaboration and investment.

A total of 322 individual projects were submitted. Many projects contributed to more than one strategic action item, collectively aligning progress towards 782 actions across the Sustainability Strategy's four priority areas: Sustainability Community, Environment, Social and Economics.

The sustainability community priority area demonstrates continued collaboration across the beef value chain through projects that strengthen partnership, knowledge sharing and alignment around sustainability goals.

The most activity occurred within the environmental priority area. Projects focused on reducing greenhouse gas (GHG) emissions, increasing carbon sequestration, optimizing cattle nutrition and feed efficiency, advancing feed and forage production, enhancing biodiversity, and improving carcass utilization.

Research and innovation are helping producers adopt practices that improve productivity while supporting environmental outcomes. However, gaps remain in manure management, measuring the Canadian beef industry's overall GHG footprint and carbon stocks, water risk assessments, and innovations that improve water use efficiency across the processing and packaging sectors.

Within the social priority area, animal care continues to be a strength, supported by research, innovation and knowledge transfer. Strong engagement was also seen in antimicrobial use, reflecting the industry's commitment to responsible, science-based animal care practices. In comparison, fewer projects addressed labour management and people's health and safety, suggesting opportunities for additional leadership and investment in those areas.

In the economic priority area, projects focused on improving producer viability through financial literacy and incentive programs for producers. Fewer initiatives addressed consumer resilience, particularly activities that increase the supply chain's ability to respond to changing market demands and improve communication about Canada's sustainable beef production practices.

Overall, the interim findings demonstrate strong engagement, particularly within environmental stewardship and animal care, and continued momentum toward achieving the priority areas set out in the Sustainability Strategy. At the same time, they identify clear opportunities to strengthen efforts in water stewardship, food loss and waste, labour management, workplace health and safety, and consumer resilience. Future success will be determined by increasing activity in identified gap areas while maintaining leadership in areas where strong progress is already being made.



Introduction of the 2026 Interim Report

The CRSB was established in 2014 to advance, measure, and communicate continuous improvement in the sustainability of the Canadian beef value chain.

In 2016, CRSB published its first National Beef Sustainability Assessment (NBSA) and Strategy, establishing a 2014 baseline for environmental, social, and economic performance across the value chain. The second NBSA, released in 2024, evaluated progress from 2014 to 2021 and informed the renewed Sustainability Strategy (2024–2030), which provides a roadmap of priority action items for continued improvement.

The NBSA and Sustainability Strategy are guided by CRSB's Scientific Advisory Committee (SAC) which also identifies key [Research Priorities and Recommendations](#) to address knowledge gaps, strengthen future sustainability measurement, and inform the next national assessment. Throughout this report, the research priorities are [highlighted alongside the strategic actions they support](#).

This Interim Report provides an update on the implementation of the Sustainability Strategy between the current and upcoming NBSAs. It highlights projects, initiatives and research that are advancing CRSB's strategic priorities and research recommendations, identifies areas where additional work is needed, and demonstrates how collaboration across the beef industry is contributing to sustainability outcomes.

The report is aligned with the [Canadian Beef Industry 2030 Goals](#), to help enhance collaboration, and reduce duplication of efforts across the industry.

The report is structured around CRSB's four strategic priority areas:

- **Sustainability Community** – collaboration, credibility, and alignment.
- **Environment** – greenhouse gases (GHG) and carbon sequestration, land use, biodiversity, water, and food loss and waste.
- **Social** – labour management, people's health and safety, animal care, and responsible antimicrobial use.
- **Economic** – producer viability and consumer demand.

CRSB is a collaborative organization committed to a shared vision of continuous improvement. Sustainability progress for the Canadian beef value chain is achieved through collective effort. This report highlights those contributions while tracking progress against the Sustainability Strategy (2024-2030).

Methodology

The CRSB Sustainability Strategy (2024–2030) was developed through a collaborative, member-driven process that identified the highest priorities for advancing the sustainability of Canada’s beef value chain. Building on the findings of the 2024 NBSA, the Sustainability Strategy established a series of strategic actions to guide continuous improvement while aligning with the Canadian Beef Industry 2030 goals to support coordination across the sector and reduce duplication of effort.

The 2026 Interim Report assesses industry-wide progress toward the Sustainability Strategy by highlighting projects and initiatives being undertaken across the Canadian beef value chain. Inclusion in the report is based on submissions to the CRSB Projects and Initiatives Database, established in 2024 to systematically collect, track and communicate sustainability-related activities across the sector.

A call for submissions was issued at the CRSB Annual General Meeting in September 2025, with submissions accepted through March 2026 for inclusion in this report. As part of the submission process, contributors were asked to identify the strategic priority, action item, sub-action item, and, where applicable, the Research Priority and Recommendation addressed by their project or initiative. Where limited submissions were received for a particular strategic action, CRSB staff conducted a targeted scan of publicly available information and, where appropriate, added relevant projects into the database through an internal submission process.

At the time of writing, the database contains **322** projects and initiatives. While this represents a substantial portion of the work occurring across the Canadian beef sector, it does not capture every activity underway. Therefore, the progress reported herein reflects only the projects and initiatives included in the database at the time of reporting. Because many initiatives contribute to multiple strategic actions or research priority, individual projects may be referenced in more than one section of this report.

Selected projects are highlighted throughout the report to illustrate the breadth and diversity of sustainability work occurring across the industry. These examples were chosen to represent different regions, organizations and approaches, and do not rank or prioritize individual projects or initiatives.

Projects are classified according to their current status:

- **Complete:** All planned activities and deliverables have been finalized.
- **In-progress:** Actively underway and expected to conclude on a defined timeline.
- **Ongoing:** Long-term or continuous activities without a defined completion date.

The Projects and Initiatives Database will remain open for ongoing submissions. Future submissions will help inform subsequent progress reports and may be featured on the CRSB website or in other communications, subject to the submitter’s consent.

[Submit Your Project or Initiative](#)

SECTION 1

COMMUNITY





Section 1: Sustainability Community

Since 2014, the CRSB is a collaborative community aligned around our mission, vision and principles of sustainable beef. The goal of the Sustainability Strategy is to support and encourage continued collaboration. Canada has demonstrated strong leadership in beef sustainability globally and is a model for many regional initiatives around the world, through the network of the Global Roundtable for Sustainable Beef (GRSB). The CRSB is also a guiding example of sustainability leadership here in Canada and is often used as a successful example and key player within the agri-food system.

1.1 Strengthen CRSB's reputation as the trusted organization for beef sustainability in Canada.

This action item includes facilitating strategic relationships and opportunities to measure and advance sustainability across the beef industry. It also includes the creation of forums for value chain discussion and collaboration, the development of science-based sustainability messaging, and the promotion of the NBSA as a credible source for Canadian beef-specific data and metrics.

What's Being Done:

There were three projects submitted under this action item, but much of the work that strengthens CRSB's reputation happens through ongoing initiatives, day-to-day communications, partnerships, and outreach efforts across the beef industry. This action item reflects the continuous nature of building trust through transparent storytelling, credible sustainability metrics, and meaningful engagement with Canadians.

COMPLETE

Project 1: Homes on The Range Short Documentary brought metrics from CRSB's NBSA to life, showcasing the importance of land used for raising beef cattle in providing critical wildlife habitat. The documentary has been selected for multiple film festivals and currently has 129,000 views on YouTube (Public and Stakeholder Engagement, PSE).

COMPLETE

Project 2: Confessions of a Canadian Beef Farmer Campaign highlighted three key environmental metrics from the NBSA. Alongside the storytelling campaign, the NBSA landing page on crsb.ca was refreshed to make sustainability information more engaging. With a reach of over 19 million across YouTube, Facebook and Instagram, these efforts improved public visibility of CRSB's work and helped reinforce the organization's position as a credible, transparent leader in sustainable beef (CRSB, Canada Beef, and PSE).

1.2 Build shared understanding of the balanced health of people, animals and the environment.

What's Being Done:

There were 18 projects submitted under this action item. Together, these projects deepen public and cross-sector understanding of how balanced health across people, animals, and ecosystems underpins the sustainability of Canadian beef production and reinforces the importance of integrated, science-driven approaches to addressing complex agriculture challenges.

COMPLETE

Project 1: The **Cows on the Planet Podcast** shared science-based information about the Canadian beef industry with a broad public audience, improving transparency and helping consumers understand the environmental and animal health considerations behind beef production (Hosts included Dr. Tim McAllister, Dr. Kim Stanford, and Dr. Kim Ominski).

ONGOING

Project 2: **Launch of the Protein Pact in Canada**, a partnership uniting stakeholders across the animal protein industry to accelerate progress towards global sustainable development goals, focusing on people, animals, communities, and the environment (Canadian Meat Council).

IN PROGRESS

Project 3: **Leveraging Ecosystems to transform Agriculture on the Prairies (LEAP)** explores appropriate agricultural intensification strategies across a diverse landscape that includes fragile lands using geospatial and other landscape analysis tools. They are designing farming systems that use technology and nature-based tools to reduce GHG emissions, capture carbon and help agriculture mitigate and adapt to negative effects of climate change (Collaboration at the University of Manitoba).

1.3 Establish and maintain strong relationships, partnerships and communication with the scientific community.

What's Being Done:

There were 12 projects submitted under this action item, each contributing to stronger connections between researchers, academic institutions, and the broader beef sustainability community. Collectively, this work helps ensure that scientific evidence remains central to conversations about sustainable beef production.

ONGOING

Project 1: **Establishment of CRSB AGM Student Sponsorship** brings two selected graduate students to the CRSB Annual General Meeting, giving students the opportunity to present their research on stage and share their research posters with members. It helps CRSB members remain connected to current scientific developments, while also giving students valuable exposure to industry conversations and perspectives across the supply chain (CRSB, established in 2024).

IN PROGRESS

Project 2: **The Beef Cattle Research Council (BCRC)'s Canadian Beef Research & Knowledge Mobilization Strategy** provides a renewed coordinated national framework to align investment, accelerate innovation and ensure research outcomes lead to measurable impact for beef producers, the broader value chain and the public. Built upon the success of previous iterations, the new Strategy will help accomplish the National Beef Strategy's ambitious 10-year goals (BCRC).

Project 3: BCRC's Canadian Beef Knowledge Mobilization Network brings together individuals from across the country who are involved in beef and forage extension efforts. The group focuses on identifying opportunities to communicate and collaborate with each other on extension initiatives that lead to greater adoption of relevant technologies and beneficial production practices on Canadian beef farms and ranches (BCRC).

1.4 Further engage youth leaders in CRSB's work.

What's Being Done:

There were three projects submitted under this action item, all aimed at strengthening the involvement of young people in shaping the future of beef sustainability. Together, these initiatives help ensure that the next generation of leaders is informed, connected, and actively contributing to the conversations and decisions that guide the sector.

Project 1: CRSB Council Ex-Officio Youth Position was established to ensure youth perspectives are represented and embedded in CRSB's approach to beef sustainability now and in the future. The objectives of this CRSB Council youth position are to provide a platform for youth to actively participate in and contribute their perspectives to the CRSB; to learn from, engage and collaborate with the multi-stakeholder representatives on the CRSB Council, and to provide governance experience and mentorship opportunities. McDonald's Canada and Cargill have sponsored this initiative for three years (2026-2028). (CRSB, established in 2025).

Project 2: The Canadian Cattle Young Leaders (CYL) program welcomes applicants aged 18-35 from across Canada, involved in various aspects of the beef supply chain, to be paired with an industry leader in their specific area of interest for a nine-month mentorship. Through mentorship, networking and travel, the Canadian CYL Program acts as an industry succession planning tool to equip the next generation of leaders with the skills and tools they need to continue to drive the growth and profitability of the Canadian beef industry. CRSB engages with the program to share the sustainability work of the Canadian beef industry (Canadian Cattle Association, CCA, established in 2010).

1.5 Inform and support information-sharing that advances the sustainability of the Canadian beef value chain.

This action item includes increasing collaboration and communication to support data and information sharing across the Canadian beef value chain. It also includes participation in initiatives that advance the 2030 Canadian Beef Goals, leadership in sustainable agriculture and multi-stakeholder collaborations, engagement in the GRSB, and the transfer of knowledge to support the practical adoption of science-based sustainable practices.

Relevant CRSB Research Priorities and Recommendations:

- Develop a systematic data collection process for parameters with significant contribution to the NBSA (feed ration, soil carbon stock).
- Improve data sharing and access through communication and collaboration.

What's Being Done:

There were 14 projects submitted under this action item. This work helps align messaging and build shared understanding around key sustainability topics, strengthen transparency, support, and measure ongoing improvements across the industry.

ONGOING

Project 1: Canadian Beef Advisors 2025-2030 National Beef Strategy provides a roadmap for achieving the industry's 2030 goals, aligning national organizations, producers, and processors around a shared vision. Built around five strategic pillars, including the newly added Sustainability pillar, the Strategy helps coordinate efforts, streamline resources, and ensure industry-wide progress toward long-term priorities (Canadian Beef Advisors, established in 2020).

ONGOING

Project 2: National Index on Agri-Food Performance: National Index on Agri-Food Performance is a growing coalition of private-public partners who are working pre-competitively to present an integrated picture of sustainability for Canada's agri-food sector from food production to retail – and improve upon it. The CRSB has participated in this initiative since its inception, collaborating with the Index's partners to exchange lessons learned and advance the Index's work. The CRSB also submits metrics to the Index from the NBSA (Centre for Agri-Food Benchmarking).

ONGOING

Project 3: Global Roundtable for Sustainable Beef (GRSB) is a multi-stakeholder pre-competitive organization committed to continuous improvement in the global beef value chain. The GRSB established the definition, principles and criteria for sustainable beef that CRSB has adopted and developed a suite of 2030 Global Beef Sustainability Goals covering climate, nature positive production, and animal health and welfare. The CRSB is an active member and serves in several leadership positions to advance the global organization's work. CRSB reports against the GRSB Global Goals every two years, leveraging metrics from the NBSA (GRSB).

SECTION 2

ENVIRONMENT

- Greenhouse Gas & Carbon Sequestration
- Land Use & Biodiversity
- Food Loss & Waste and Carcass Utilization
- Water





Section 2: Environment

The Environmental Life Cycle Assessment (E-LCA) of the 2024 NBSA indicated that from 2014 to 2021, producing 1 kg of boneless beef resulted in a 15% reduction in GHG emissions - progress that keeps the industry on track toward its 2030 goal of a 33% reduction in emissions intensity compared to the 2014 baseline. Over the same period, improvements were also seen across several environmental indicators, including less fossil fuel and water use, and reduced impacts on water and air quality.

The Land Use Assessment (LUA) of the 2024 NBSA showcases the role of grazing cattle in Canada in preserving soil carbon and wildlife habitat. It showed that land used for beef production accounts for 40% of Canada's crop and pastureland yet supports and maintains 74% of the habitat critical for wildlife reproduction (nesting and raising their young). This same land is estimated to store 1.9 billion tonnes of soil organic carbon, with 91% of it held in native and tame grasslands.

As progress continues across environmental indicators, the following section highlights the projects and initiatives that help support this work.

2. Greenhouse Gas (GHG) & Carbon Sequestration



2030 Canadian Beef Industry Goals:

- From 2014 to 2030, reduce primary production GHG emission intensity by 33%
- Safeguard 1.5 billion tonnes of carbon stored on land managed by beef producers.
- Sequester an additional 3.4 million tonnes of carbon every year.

2.1 Encourage research and collaboration to optimize cattle diets.

Relevant CRSB Research Priorities and Recommendations:

- Develop cost-effective methods of reducing GHG emissions or emissions intensity in primary production through diet or productivity.

What's Being Done:

There were 56 projects submitted under this action item, making it one of the most active areas across the Sustainability Strategy. Together, these projects focus on various topics, including improving feed efficiency, methane-reducing feed additives, rumen microbiome intervention, forage quality, grazing systems, and genetic strategies.

Project 1: Potential for dietary mitigation of enteric methane during winter feeding in Canadian beef cows will determine if provision of feed additives along with supplemental feed is enough to reduce methane and improve cow efficiency while considering farm level economics (Dr. Stephanie Terry, Agriculture and Agri-Food Canada).

IN PROGRESS

IN PROGRESS

Project 2: Understanding the Influence of Grazing Management Regimes on Cow Methane Emissions in Canada. Cattle on grass have the highest methane emissions, for which currently available methane mitigation strategies are not practical. To understand how to reduce methane emissions on pasture, we need to understand current baseline levels of methane production as well as how common grazing management strategies affect methane emissions (Dr. Katie Wood, University of Guelph)

COMPLETE

Project 3: Examining the Microbial Basis of Forage Digestion Efficiency in Beef Cattle. The researchers aimed to understand why some cattle digest forages more efficiently than others by examining microbial ecology, key microbial genes, animal physiology, and how efficiency rankings shift with diet. Their findings showed that physical and behavioural traits play a larger role in fibre-digestion efficiency than the microbial community itself. They also found that protozoa and fungi were more strongly associated with fibre-digestibility rankings than bacteria or archaea, highlighting them as potential targets for improving feed efficiency (Dr. Robert Gruninger, Agriculture and Agri-Food Canada).

IN PROGRESS

Project 4: Use of Multiple Mitigation Strategies to Reduce GHG Emissions in Beef Cattle Production Systems will evaluate how “stacking” multiple proven BMP’s such as improved forage quality, added high-fat by-products, ionophores, seeding legumes, and extended grazing can reduce GHG emissions from Canadian beef cattle while improving production efficiency. Using the Holos 3 model, the team will estimate whole-farm reduction potential and identify the most beneficial combinations to support the industry’s goal of reducing emissions intensity by 33% by 2030 (Dr. Kim Ominski, University of Manitoba).

2.2 Promote implementation of practices to enhance manure management.

Relevant CRSB Research Priorities and Recommendations:

- Quantify the potential of changes in manure storage and handling (e.g. biodigesters, acidification of manure) to reduce emissions intensity.

What’s Being Done:

There were nine projects submitted under this action item. While several of these projects include elements related to manure, most do not directly focus on implementing practices that enhance manure management.

COMPLETE

Project 1: Canadian Alliance for Net-Zero Agri-food (CANZA)’s Taking Action on Methane Emissions: Untapping Canada’s Agricultural Biogas Opportunity report examines biodigesters as one possible method for capturing methane from manure emissions. It summarizes Canada’s current low use of agricultural biogas and outlines economic and policy factors that affect biodigester adoption. The report compiles expert and producer insights to describe existing barriers and considerations related to expanding biogas production (CANZA).

COMPLETE

Project 2: Manure storage practices in Canada: farm survey analysis with implications for GHG emissions analyzed Canadian Farm Management Surveys (conducted in 2017 and 2021) to quantify the prevalence of manure management systems and use of mitigation practices and to identify changes over time. Results indicated that beef operations mainly use solid manure storage, often kept for more than

six months, and adoption of emissions-reducing practices such as composting (<5-10%), additives (<10%), or anaerobic digestion (<1%) is very low, indicating significant room for improvement in reducing manure-related emissions (Dr. VanderZaag, Agriculture and Agri-Food Canada).

2.3 Collaborate with initiatives that work to safeguard carbon storage and increase carbon sequestration.

This action item includes supporting grazing BMP's, programs to maintain and restore native grassland, pasture and rangelands, and the development of tools and research to better measure carbon on beef-producing lands. It also includes knowledge transfer activities and resources that support producers in adopting BMP's.

Relevant CRSB Research Priorities and Recommendations:

- Quantify the impact of land management on carbon storage potential; developing and/or incorporating regionalized values for soil cover, type and climate parameters.

What's Being Done:

There were 23 projects submitted under this action item. Many address grazing management, forage systems, and land-use practices that influence carbon storage. Together, these projects contribute to a broader understanding of how beef producing landscapes can help maintain and enhance carbon storage potential.

IN PROGRESS

Project 1: Climate Action Through Grazing (CAT-G) aims to store an additional 32.5 Mt of carbon within Canadian grasslands, worth an estimated \$5.5B. To achieve this, the team will use genomic technologies to understand how aspects of grazing management (rotational vs continuous grazing) differentially impact soil carbon sequestration and GHG emissions, mediated by changes in soil and fecal microbiomes. The project will develop effective management practices that lead to climate-smart outcomes, enhance models for farm-level GHG emissions, create tools that support producer management decisions, produce public policy tools to enhance adoption, and create protocols to quantify soil carbon sequestration and GHG (Dr. James Cahill and Dr. Carolyn Fitzsimmons, University of Alberta).

COMPLETE

Project 2: Quantifying the effects of adaptive multi-paddock grazing (AMP) on soil carbon sequestration and soil organic matter quality results found that AMP grazing in southern Ontario increased stable soil carbon, through boosts in mineral-associated organic matter, healthier root systems, and greater microbial abundance, compared to continuous grazing (Dr. Kim Schneider, University of Guelph).

COMPLETE

Project 3: Quantifying the Economic Benefits and Carbon Capture Efficiency of Including Forages in Cropping Systems provided evidence for the importance of maintaining agricultural practices that support soil organic matter inputs to increase soil carbon stock and stability. The results highlight the significant economic value of soil carbon in agricultural soils, supporting the need for novel future land-use policy changes that reward producers for adopting practices that increase soil carbon stocks and stability, including continuous cropping, use of manure as a rotational amendment and the partial or prolonged use of perennial forages. (Dr. Edward Bork, University of Alberta).

2.4 Collaborate with initiatives that support improvements in feed and forage production.

Relevant CRSB Research Priorities and Recommendations:

- Develop cost-effective methods of reducing GHG emissions or emissions intensity in primary production (feed and forage).

What's Being Done:

There were 72 projects submitted under this action item, making it one of the most active areas across the strategy. Submissions focus on improving forage productivity, quality, resilience, and management. These projects cover a wide range of work, including forage breeding, nutrient optimization, drought-tolerant varieties, intercropping, pasture rejuvenation, and integrated crop-livestock systems.

IN PROGRESS

Project 1: Improving the Value and Environmental Impact of Barley Through Breeding focuses on developing barley varieties with improved forage quality, higher digestibility, increased disease resistance, and more stable yields, which can enhance efficiency in beef production (Dr. Aaron Beatie, University of Saskatchewan).

IN PROGRESS

Project 2: Growing Your Own TMR: Selecting Forage Mixtures for Animal Performance, is determining if it is possible to design and grow forages that more closely meet the nutrient requirements of the cattle being fed and if such a strategy can improve forage production, reduce risk, and improve return on investment. This will provide more information on forage mixtures and a formula for producers to follow if they wish to also select forage mixtures based on animal performance. (Dr. Greg Penner, University of Saskatchewan).

IN PROGRESS

Project 3: Integration of Livestock on Annual Crop Land allows cattle and crop producers to use cattle to graze farmland, with the potential benefit being that beef producers get access to feed and crop farmers get manure deposited on their farmland. This study aims to improve the resiliency of beef cattle production through novel grazing strategies utilizing annual forages and cover crops to better meet animal nutrient requirements and understand the impact of grazing on the plant-animal-soil interface. Economic viability will be evaluated in a cost and return analysis, and researchers will develop a decision-making tool for both crop and livestock producers. (Dr. Emma McGeough, University of Manitoba).

2.5 Collaborate with initiatives that develop genetic selection tools that reduce GHG emissions.

Relevant CRSB Research Priorities and Recommendations:

- Develop cost-effective methods of reducing GHG emissions or emissions intensity in primary production (animal productivity).

What's Being Done:

There were 21 projects submitted under this action item with most focusing on genomic tools, genetic selection strategies, breeding management and animal-level traits that influence productivity, feed efficiency, carcass quality and emissions intensity.

ONGOING

Project 1: Global Institute for Food Security (GIFS) and Canadian Beef Improvement Network (CBIN) Strategic Partnership offers state-of-the-art DNA testing and analysis services for Canada's beef industry—bringing critical high-throughput genotyping capabilities home and strengthening Canada's position in the global beef market. This capability builds resiliency by providing the beef industry with a faster, secure, and more reliable pathway to gaining genetic insights and certifying pedigree (GIFS and CBIN).

IN PROGRESS

Project 2: Effect of divergent fibre digestion efficiency on growth performance, methane emissions, and carcass characteristics of beef cattle, and its association with the host genetic/genomic makeup project can help identify which genetic and microbial factors drive the most efficient animals. Long term, this could lead to DNA-based tools to help producers select cattle that perform better on forage diets while reducing emissions intensity (Dr. Gabriel Ribeiro, University of Saskatchewan).

2.6 Measure and disseminate the Canadian beef industry's GHG footprint and carbon stock.

What's Being Done:

There were nine projects submitted under this action item. Many submissions include components related to GHG emissions or carbon measurements, although none directly measure the industry's GHG footprint or carbon stock. The projects highlighted were selected for their role in informing the next NBSA.

IN PROGRESS

Project 1: A Benchmark study of the Canadian feedlot industry and an evaluation of BMPs to improve the sustainability of feedlots will help to fill a data gap surrounding management practices in the feedlot sector including growth promotants and feed additives currently used in feedlots to help to improve efficiencies and reduce GHG production (Dr. Gabriel Ribeiro, University of Saskatchewan).

IN PROGRESS

Project 2: Canadian Cost of Production Network 2023-2028 will share cost of production data among comparable operations for better on-farm decision making and will be a critical dataset for the upcoming NBSA (Brenna Grant, CanFax).

2.7 Promote communication and knowledge transfer between the research community and producers to increase uptake of practices that reduce GHG emissions and improve carbon sequestration.

Relevant CRSB Research Priorities and Recommendations:

- Develop cost-effective methods of reducing GHG emissions or emissions intensity in primary production (animal productivity).

What's Being Done:

There were 23 projects submitted under this action item, the initiatives captured here were selected for their primary focus on extension and communication.

COMPLETE

Project 1: Regenerative agricultural knowledge translation and transfer for grassroots forage and livestock producers in Alberta, helping to close the gap between research and on-farm implementation. Through demonstrations, workshops, field days, online resources, and one-on-one support, Applied Research Associations delivered practical knowledge on soil health, forage quality, and water management to help producers enhance productivity, profitability, and ecological resilience (Foothills Forage and Grazing Association).

COMPLETE

Project 2: Motivations, Barriers, and Alternatives to Feed Testing for Cow-calf Producers. The use of lab-based feed testing for cow-calf producers is a recommended practice for the industry, but adoption rates for this practice have not changed substantially in the last decade. By understanding differing perceptions and motivations, extension messages can be developed including performing and interpreting a feed test, the value of feed testing and the non-clinical impacts from inadequate nutrition to align with producer goals and ultimately encourage greater use of feed testing (Dr. Emma Stephens, Agriculture and Agri-Food Canada).

3. Food Loss & Waste and Carcass Utilization



2030 Canadian Beef Industry Goals

- Reduce food loss and waste (from secondary processing to consumer) by 50% by 2030.
- Increase the value of AAA and Prime carcasses, to be equivalent with the US, by building demand for all cuts on the carcass.
- Support the development, regulatory approval and adoption of improved food safety interventions and technologies throughout the supply chain.

3.1 Encourage programs and projects that help food diversion efforts and reduce barriers to implementation.

What's Being Done:

There were 10 projects submitted under this action item. The common themes included consumer education, processing-level waste reduction, shelf-life extension, and alternative uses for surplus food. The projects below were selected based around consumer education, other topics are highlighted throughout this section.

COMPLETE

Project 1: Best Before Date Awareness Campaign was a collaborative effort between Canadian Food Focus and Love Food Hate Waste Canada focused on clarifying the difference between “best before” and “expiration” dates—a source of confusion that leads to significant household food waste. The campaign provided clear, accessible tools, such as storage guides, interactive activities, and practical tips for making food last longer and saving money while reducing environmental impact (Canadian Food Focus).

ONGOING

Project 2: The Canadian Beef Information Gateway is a website that allows consumers to scan meat package barcodes to access a wide range of useful information to help them select, prepare and enjoy Canadian beef. Easy access to this information including selecting a beef cut and cooking instructions can help promote the reduction of food waste through uptake of underutilized cuts and how to properly prepare food (Canada Beef).

3.2 Further enhance understanding of food loss and waste in the Canadian beef value chain.

This action item includes collaboration and information sharing on policies, regulations, and opportunities for by-product upcycling and food waste utilization. It also includes efforts to promote data collection and measurement of meat loss and waste throughout the supply chain.

Relevant CRSB Research Priorities and Recommendation:

- Canadian specific information regarding food waste, at and beyond the packer’s gate at processing, retail/foodservice and the consumer.

What's Being Done:

There were 11 projects submitted under this action item. Several projects focused on processing plant innovations. Few projects directly measure food loss and waste, reflecting a challenge identified in the

absence of a standardized national system or common methodology for tracking and quantifying food loss and waste.

COMPLETE

Project 1: The Avoidable Crisis of Food Waste: Technical Report Update was a follow-up to Second Harvest's initial research report published in 2019 that quantified food waste in Canada by examining the entire value chain. Every year, 46.5% of all food in Canada is wasted, even though 41.7% of it could be redirected to support Canadians; with 23% of avoidable waste driven by best-before dates along the supply chain, this adds up to \$58 billion in avoidable food loss annually. The report found that since 2019, there was greater consumer awareness about food waste. Measurement efforts across the supply chain with total food waste reduced by 19.7% indicating that the overall Canadian food system is more efficient in 2024 than in 2019 (Second Harvest).

IN PROGRESS

Project 2: Potential for inclusion of surplus food in beef cattle diets project examines how food waste and by-products can be effectively used as alternative feed sources for beef cattle. As ruminants can convert these materials into high-quality protein for humans, the research team is identifying current and future opportunities to improve the use of surplus food in cattle diets, including developing BMP's for ensiling food waste. The work involves testing different combinations of grocery and bakery waste ensiled for various durations and evaluating their digestibility and suitability as feed. The data generated will be used to model the impacts of incorporating surplus food on GHG emissions, land use change, and beef production economics. This project will highlight knowledge gaps and provide strategies to help producers more effectively and confidently use surplus food on-farm (Dr. Stephanie Terry, Agriculture and Agri-Food Canada).

COMPLETE

Project 3: Reduce, Reuse, Ruminant is a short documentary developed by PSE to highlight the upcycling ability of cattle and their role in diverting food loss and waste from landfills. Transforming beer byproducts and French fries into beef are two of the sustainability stories featured, demonstrating the circular economy and zero waste strategies in our food system. The documentary has been selected for multiple film festivals and currently has 32,000 views on YouTube (PSE).

3.3 Encourage research and adoption of packaging that enhances product life, and reduces food waste and environmental impact while aligning with ongoing national and global initiatives.

What's Being Done:

There were five projects submitted under this action item, although few directly addressed the action item. Additional research and collaboration will be needed to better explore packaging solutions that can meaningfully reduce waste while aligning with national and global sustainability initiatives.

COMPLETE

Project 1: Development and validation of novel "green" technologies for improving the safety and shelf-life of beef. Food safety interventions in commercial beef packing plants are highly effective at producing carcasses with extremely low microbial counts when they are properly installed and maintained. However, the greatest risk occurs after these interventions, when carcasses move through the facility and may become re-contaminated during fabrication into smaller cuts. This project aims to validate new dry and wet surface-sanitation methods, as well as develop and validate innovative carcass-chilling approaches that enhance microbial inactivation. Developing effective cleaning strategies

that reduce the need for hot water would significantly reduce the energy and water required to clean commercial packing facilities while maintaining high standards of beef safety and shelf-life (Dr. Roopesh Syamaladevi, Agriculture and Agri-Food Canada).

IN PROGRESS

Project 2: Goodbye Plastic? Evaluating a novel biological net wrap for Canada. Although not at the consumer level, this project explores the potential to reduce on-farm plastic use by evaluating a biodegradable net wrap for bales. Researchers are determining how this biological net wrap breaks down inside the rumen, with a focus on animal health implications, and assessing whether bales can be processed without removing the wrap. The product has already undergone equipment-compatibility testing, as well as environmental and structural durability testing across different regions. This study represents the next step in confirming whether the net wrap is safe for cattle if ingested and assessing its practical viability for Canadian production systems (Dr. Brenda Ralston, Lakeland College).

3.4 Support initiatives to improve carcass quality and utilization.

This action item includes supporting dialogue on Specified Risk Material (SRM) regulations, knowledge transfer activities that promote practices to enhance carcass quality, and support for research and market development initiatives for creating value from underutilized cuts.

What's Being Done:

There were 27 projects submitted under this action item. Collectively, they span a broad range of work aimed at improving carcass quality, grading accuracy, food safety, processing efficiency, and overall value utilization across the beef sector.

COMPLETE

Project 1: Specified Risk Material (SRM) Risk Analysis - Problem Formulation & Risk Analysis Report.

Guidance in the report ensures removal of specified risk material (SRM) from edible meat, prevention of cross-contamination to edible meat products by SRM during slaughter and cutting / boning operations and when monitoring enhanced feed ban controls. The purpose of the analysis was to support the redesign of Canada's bovine spongiform encephalopathy surveillance program to align it with the World Organisation for Animal Health's (WOAH) recently revised international standards (Risk Sciences International Inc).

IN PROGRESS

Project 2: Upcycling of Low Valued Cattle Hides into Alternative Protein Food Products. Almost half (44%) of a harvested cattle carcass can be classified as by-products. The hide can account for 10% of live weight and 30-75% of by-product value. The overarching objective is to add value to fresh salted, or unsalted, defective unused hides and hide trimmings from beef abattoirs, and turn them into food products and food-co-products. Being able to utilize hide trimmings in this fashion would not only reduce food waste and the industry's environmental footprint but also open a potential new market in the alternative food space with a high-quality, high protein snack food option (Dr. Heather Bruce, University of Alberta).

IN PROGRESS

Project 3: Assessment of the Population Structure of *E. coli* O157 from Cattle and Associated Food Safety Risks. Shiga-toxin-producing *Escherichia coli* (STEC) are the main food safety concern in Canadian beef. When the screening test indicates that STEC may be present (i.e., a "positive" test result), the beef needs to be held for confirmatory testing. This can take several days, so sometimes the beef is simply

discarded. The objective of this project was to determine the likelihood of false positives by the current *E. coli* O157:H7 testing methods; the project will assess how common “atypical” *E. coli* O157 are, and work to develop more sensitive screening tests that will selectively detect pathogenic STEC. This will ensure food safety for consumers while reducing unnecessary food waste (Dr. Xianqin Yang, Agriculture and Agri-Food Canada).

4. Land Use & Biodiversity



2030 Canadian Beef Industry Goals:

- Maintain the 35 million acres of native grassland, of which the majority is in the care of beef producers by focusing on economic viability of producers and supporting programs that incentivize conservation in collaboration with Canadian crop groups.
- Maintain a network of natural landscapes and healthy functioning ecosystems through well-managed grazing systems that maintain sustainable plant communities and healthy rangelands:
 - Maintain and enhance the 68% of wildlife habitat capacity.
 - Enhance ecosystem services.
 - Encourage practices that build soil organic matter and enhance soil biodiversity.

Relevant CRSB Research Priorities and Recommendations:

- Quantify the economic, agronomic and biodiversity benefits of integrated annual crop, forage and beef production systems.
- Improve land use data quality - clarifying national land use conversion numbers and identifying land that is at high risk of conversion.
- Further identify and quantify BMP's including rotational grazing, stocking capacity, grazing days per acre, and soil health through technical assessments.

4.1 Support the creation and adoption of ecosystem services payments, markets and producer incentives.

This action item includes supporting the development and adoption of tools for measurement and monitoring of environmental outcomes from beef production, promote coordination of funding opportunities for producers, and facilitating the sharing of science-based information and collaboration.

What's Being Done:

There were 15 projects submitted under this action item. Projects include programs and tools to measure or support ecosystem services, the following projects were selected due to their economic objectives.

Project 1: Estimating the Cost of Providing Ecosystem Goods and Services on Prairie Grasslands. Most beef producers maintain some form of ecosystem goods and services (EGSs) on their operations. Protecting or maintaining EGSs sometimes require reductions in potential revenue due to management decisions. This project will provide useful information for producers to understand the cost and tradeoffs of maintaining EGSs on their land and could be used in future conversations with policy makers and NGOs about the value of this type of service (Dr. Hayley Hessel, University of Saskatchewan).

IN PROGRESS

IN PROGRESS

Project 2: Economic assessment of native species adoption in prairie grasslands: From identifying barriers to modelling solutions. Maintaining or expanding the area covered by grasslands is necessary for the sustainability of the cattle industry but requires an improved accounting of the broader benefits they provide society in addition to forage production. This includes non-market ecosystem services such as carbon sequestration, pollination, pest control, biodiversity conservation, and conservation of culturally important species and landscapes. This study will use a combination of stakeholder engagement meetings and producer surveys to better understand the barriers to native species adoption. Additionally, they will use a variety of economic techniques – focusing on land valuation, carbon valuation, and consumer willingness-to-pay – to better value the ecosystem services provided by grasslands and stewarded by livestock producers (Dr. Patrick Lloyd-Smith, University of Saskatchewan).

COMPLETE

Project 3: Quantifying the Economic Benefits and Carbon Capture Efficiency of Including Forages in Cropping Systems provided compelling evidence for the importance of maintaining agricultural practices that support soil organic matter inputs to increase soil carbon stock and stability. Equally important, the study highlighted the significant economic value of soil carbon in agricultural soils – a value expected to grow as the federally mandated carbon pricing increases. In turn, this work lays a foundation which supports the need for novel future land-use policy changes that reward producers for adopting practices that increase soil carbon stocks and stability, including continuous cropping, use of manure as a rotational amendment and the partial or prolonged use of perennial forages. (Dr. Edward Bork University of Alberta).

4.2 Facilitate collaboration across stakeholder groups to develop a shared understanding of the challenges and potential solutions to promote biodiversity.

What's Being Done:

There were 18 projects submitted under this action item. Many submissions are highlighted under other action items in Section 4 – Land Use, the following are highlighted due to their awareness components.

ONGOING

Project 1: The Habitat and Biodiversity Assessment Tool (HBAT) was originally developed in Alberta and is a source of biodiversity conservation information and supporting resources for those interested in habitat stewardship on the land they own or manage. It is specifically designed as an extension and awareness tool and is based on the potential for species to occur in an area. It is meant to help land managers gain an understanding of important habitats and biodiversity on their land and the stewardship opportunities they could implement to sustain them (Canadian Forage and Grasslands Association).

COMPLETE

Project 2: Targeted Grazing Wildfire Reduction Project found that targeted grazing was broadly successful in removing fine fuel quantities, lowering the fine fuel and reducing fuel continuity across pilot sites located in community interface areas of the Okanagan and East Kootenay, B.C. These outcomes reduced wildfire rate of spread, intensity and flame length based on preliminary wildfire modelling outputs, highlighting the value of targeted treatments in reducing fire behaviour through effective and consistent removal of fine fuels. BC Cattlemen's Association Project Delivery Inc. is producing a set of beneficial management practices from these pilots that producers can utilize (British Columbia Cattlemen's Association).

4.3 Support work that builds understanding and enhances or restores habitat quality and quantity on beef [production] operations.

What's Being Done:

There were 19 projects submitted under this action item. Projects include economics of ecosystems services, tools available for measurement and programs available to maintain and promote ecological functions.

ONGOING

Project 1: Using the **Bird-friendliness Index (BFI)** to incentivize biodiverse production systems will slow the conversion of grasslands to cropland by reducing the revenue gap between cash cropping and grass-based production systems. The BFI will be used to incentivize production systems that are biodiverse and – in the case of grasslands – also carbon-rich. The BFI is a dependable, scalable, and actionable biodiversity indicator that is adaptable to a variety of working landscapes. It can be used to quantify biodiversity impact at a farm level and to communicate those impacts throughout the agri-food supply chains. Stakeholders will be identified who want to support biodiverse grass-based systems, offering financial incentives to ranchers with a high BFI (Birds Canada).

IN PROGRESS

Project 2: Best Management Practices for Converting Marginal Farmland aims to identify options to restore or convert economically marginal farmland, evaluate technology that can aid implementation, identify operational implications, and assess the economic cost benefit for each option. This project brings value to producers to identify strategies to manage marginal farmland based on the observed environmental factors and showcase how producers can increase their per-acre-profitability while bettering their environmental sustainability (Olds College Centre for Innovation, Farm Credit Canada).

4.4 Build further awareness and use of range health assessments by producers.

What's Being Done:

There were nine projects submitted under this action item. The project below was chosen as it was the most aligned with range health assessments. Other projects submitted are highlighted in other areas of Section 4 – Land Use.

COMPLETE

Project 1: Saskatchewan Rangeland Health Assessment for Native Grasslands Workbook guides users through scoring five different range health indicators. A range health assessment can serve as a baseline, and a useful tool, for tracking and communicating successes or identifying potential management challenges. It's impossible to confine rangeland into boxes and checklists; however, the scoresheet is designed to prompt observations and field notes to help document ecological processes (Saskatchewan Prairie Conservation Action Plan).

5. Water



2030 Canadian Beef Industry Goals:

- Promote practices that maximize water quality and retention, to deliver healthier landscapes, resilience to drought and flood events, and groundwater recharge as appropriate to the region's precipitation.
- Improve water use efficiency in the beef value chain.
- Build recognition by the public and policymakers of the benefits provided by grassland ecosystems, including:
 - Protection of wetlands and their role as important carbon sinks
 - Filtration of nutrients that protect quality and reduce non-point source pollution
 - Resilience to drought and flood events
 - Support groundwater recharge and future water supplies

Relevant CRSB Research Priorities and Recommendations:

- Quantify the value of BMP's that provide benefits (groundwater recharge, water filtration of runoff, faster recovery from flood or drought).
- Develop a National Riparian Health Indicator potentially using satellite data.
- Quantify phosphorus (P) excretion rates of grazing animals, and nitrogen impacts on GHG emissions and P runoff and leaching impacts on water quality compared to adjacent cropland and ability of forage or pasture strips act as a buffer.
 - Address regional gap in eastern Canada and update Agriculture and Agri-Food Canada estimates for erosion on pastureland.
- Quantify the impact of native and tame pasture management on water use, cycles and watersheds in eastern Canada.

5.1 Build further beef producer understanding, awareness and use of riparian health assessments by supporting organizations that are enhancing awareness and promoting adoption of tools.

What's Being Done:

There were seven projects submitted under this action item.

ONGOING

Project 1: Livestock Water Quality Testing in BC provides a system for livestock producers to test their water and potentially mitigate losses. This project is modeled after the Saskatchewan Livestock Water Testing program. Eight YSI Pro 30 handheld conductivity meters were purchased and distributed across British Columbia (British Columbia Cattlemen's Association).

ONGOING

Project 2: Success with ALUS Wetland Projects. ALUS works with farmers and communities across Canada to create, restore and enhance wetlands on agricultural landscapes. ALUS has created informative guidebooks for its Eastern and Western communities, highlighting current projects and how to establish projects in each region (Alternative Land Use Services [ALUS]).

5.2 Collaborate with stakeholders to further measure the relationship between beef production and wetland conservation, and the associated ecosystem services being provided.

What's Being Done:

There were six projects submitted under this action item.

COMPLETE

Project 1: Prairie Ecosystem Climate and Carbon Project (PECCaP): Quantifying the Contribution of Landscapes That Support Livestock Production. Many Canadian studies are looking at ecosystem services provided by grazing cattle, but few focus specifically on wetlands. This study found that beef production landscapes are important for maintaining wetlands on the landscape and the ecosystem services associated with them, and support understanding for how beef production landscapes contribute to biodiversity while also moderating local/regional climate. This project provided the first estimates for the broader set of ecosystem services associated with the ~2 million hectares of wetlands in beef production landscapes of the Canadian Prairies. These metrics include:

- Storing 5,157,563,904 m³ of water
- Retaining up to 6,467,102 kg of P per year and 24,115,641 kg of nitrogen per year
- Storing 423,464,202 tonnes of CO₂eq that are vulnerable to conversion if drained.

(Dr. Pascal Badiou, Ducks Unlimited Canada)

ONGOING

Project 2: Empowering Ranchers to Conserve Grasslands – RangeFlex, builds on Ducks Unlimited Canada's (DUC) original Rangeland Program launched in 2021 with support from the Weston Family Foundation's Prairie Grassland Initiative offering greater support to prairie beef producers and Indigenous communities to scale up BMP adoption while conserving important habitat (Ducks Unlimited Canada)

5.3 Partner with organizations that deliver producer extension to encourage uptake of practices to preserve wetlands.

What's Being Done:

There were seven submissions in this area covering programs and tools available. The majority of submissions are highlighted throughout other sections; the following projects were selected due to their knowledge transfer focus.

ONGOING

Project 1: The Ag Resource Tool (ART) is a high-detailed mapping product providing an overhead view using current satellite imagery and comes with an industry reputation as a valuable land management tool. The level of detail can be tailored to suit producer needs, ranging from basic imagery to maps indicating fence lines, water for livestock and gates. These maps are a useful reference for grazing and rotation planning, communicating with cooperators/managers, and plotting out future developments (Ducks Unlimited Canada).

ONGOING

Project 2: Species at Risk Partnerships on Agricultural Lands (SARPAL) is focused on working with farmers to support the recovery of species at risk on agricultural land. SARPAL funds conservation actions currently focused on supporting 12 target Species at Risk (Environment and Climate Change Canada).

5.4 Build awareness about the limitations in water risk assessments and the importance of local context when interpreting the results, nationally and internationally.

What's Being Done:

There was one submission in this area and directly addresses the sub-item “Promote further understanding of how on-farm practices affect water quality, taking into account regional variability”

COMPLETE

Project 1: Watershed-Scale Assessment of Water and Nutrient Dynamics of Improved Pastures Utilized by Beef Cattle. The effects of nutrient run-off from Canadian pastures are a concern for producers, lawmakers, and the public, but little work has been done to assess the Canadian context. Policy and practices to reduce phosphorus (P) and nitrogen (N) exports into watersheds should focus on soil and vegetation, although manure does still play a role. The differences seen across the different locations suggest that there is no one-size-fits-all solution for preventing N/P export to watersheds, and potential management solutions should be regionally specific (Dr. Marcos Cordeiro and Dr. David Lobb, University of Manitoba).

5.5 Support innovation that increases water use efficiency within the processing and packaging sectors.

What's Being Done:

There was one submission in this area, which includes a vital study for progress on the item.

IN PROGRESS

Project 1: To Explore Conditions for Improving the Efficiency of Water Usage During Sanitation, researchers plan to investigate ways to reduce cross contamination from aerosols and biofilms using less hot water and pressure, leading to improved effectiveness of cleaning, reduction in water usage, as well as improved microbiological safety of meat. Its objective is finding ways to effectively clean packing plants using less water and energy without sacrificing food safety, which will support the environmental, economic and social sustainability of Canada's beef processing sector (Dr. Xianqin Yang, Agriculture and Agri-Food Canada).

5.6 Support improvement in feed yields/productivity, drought resistance and irrigation practices to reduce the blue water footprint of feed.

Relevant CRSB Research Priorities and Recommendation:

- Encourage implementation of efficient measures for irrigation in the Prairies including efficient equipment and systems.

What's Being Done:

There were 14 projects submitted under this action item. Although many focus on pasture or forage rejuvenation, the projects highlighted below are those that are focused on feed production and its associated water footprint.

IN PROGRESS

Project 1: Improving the Value and Environmental Impact of Barley Through Breeding focuses on developing barley varieties with improved forage quality, higher digestibility, better disease resistance, and more stable yields, which can enhance feed efficiency in beef production (University of Saskatchewan – Dr. Aaron Beatie).

Project 2: Mueller Irrigation Research Group investigates technologies and software for sophisticated water management on farms and quantify yield and subsequent resource changes. Researchers explore the impacts of changes in water use efficiency at the field scale on needs for water storage, distribution, and licensing at the level of irrigation districts and watersheds. The research is shaped in close collaboration with local producers, the provincial government, and the irrigation districts (Lethbridge Polytechnic).



SECTION 3

SOCIAL

- Labour Management
- People's Health & Safety
- Animal Care
- Antimicrobial Use





Section 3: Social

The Social Assessment of the 2024 NBSA made key observations in the life cycle of Canadian beef production, identifying strengths and how to manage the risks and challenges regarding labour management, people's health and safety, animal care, and antimicrobial use (AMU).

The NBSA indicated that labour availability, recruitment and retention are increasing workload levels with potential negative repercussions on people working in the industry. However, it is recognized that there are broad awareness and efforts being made across sectors to address workload levels and integrate innovative approaches to reduce risk.

Health and safety are also identified as an area that can be overlooked and where more dedicated efforts are needed. Producers are experiencing high levels of physical and mental stress; however, on a positive note, awareness and the stigma around mental health are improving.

Animal care is a success story in Canada, and many federal regulations and industry standards (e.g. Code of Practice for the Care and Handling of Beef Cattle) play a role; increased coordination and communication across areas within the beef supply chain are areas for improvement to fully secure animal care throughout the cattle life cycle.

Antimicrobial use is important to the industry and its stakeholders. There are good practices currently being utilized by producers to ensure responsible use. Further training would be beneficial to drive continuous improvement. Room for improvement also exists with respect to the adoption of management practices associated with AMU, including further reduction of stressors and increased access to veterinarians in some regions.

As progress continues across social indicators, the following section highlights the projects and initiatives that help support this work.

6. Labour Management



2030 Canadian Beef Industry Goal:

- Support innovation, research, refinement and commercialization of technologies throughout the supply chain that support economic viability and worker conditions.

Relevant CRSB Research Priorities and Recommendation:

- Assess factors driving workload, implications of high workload and identification of economically viable BMP's that could reduce workload.

6.1 Support initiatives that increase labour availability, training, recruitment and retention.

What's Being Done:

There were five projects submitted under this action item; the projects below show a diverse array of work across beef industry stakeholders.

COMPLETE

Project 1: Development of training tools for feedlot producers to address workplace shortages aimed to bridge that gap through development of practical training tools to ensure workers can do their job effectively, efficiently, and safely (Alberta Cattle Feeders' Association).

ONGOING

Project 2: National Farm Leadership Program helps farmers identify the critical development areas that will have the greatest impact on their personal and professional lives. Good leadership is good for business and the well-being of the leader and those they work with (Farm Management Canada).

ONGOING

Project 3: Evidence based veterinary medicine admissions criteria to meet Alberta's agricultural needs will support recruitment, training and retainment of veterinary personnel thus supporting the agricultural industry and building public trust (Dr. Robert McCorkell, University of Calgary).

6.2 Promote implementation of practices to enhance labour management.

This action item includes increased communication skills, dispute resolution and professional development.

What's Being Done:

There were 13 projects submitted under this action item, most of which are highlighted within Labour Management and other areas of the Interim Report.

ONGOING

Project 1: AGRI HR Toolkit optimizes HR practices and processes for employers. Developed by subject matter experts through extensive stakeholder consultation and years of research and field testing, the Toolkit is the go-to resource to address the unique needs of the Canadian agriculture industry (Canadian Agricultural Human Resource Council, CAHRC).

ONGOING

Project 2: Grow the Future - A Practical Guide for Developing Sector Action Plans for Finding and Keeping Workers in Agriculture & Food Processing in Ontario aims to help develop sector action plans to assist employers to find and keep workers, and help their workforce adapt to emerging skills that will be needed in the coming decade (CAHRC).

6.3 Support adoption of best management practices, business tools and new technology to reduce workloads across the beef supply chain, focusing particularly on family farm businesses, while considering the practicality of implementation.

What's Being Done:

There were 12 projects submitted under this action item, some of which are highlighted in other Labour Management action items. Projects highlighted below include specific technologies and surveys being conducted to reduce workloads across the supply chain.

IN PROGRESS

Project 1: Labour Requirements of Saskatchewan Cow-Calf Operations is a project to generate labour efficiency ratios for cow-calf operations in Saskatchewan with increased accuracy for use in cost of production modelling and benchmarking, and to aid in the development of time-saving solutions or agriculture technology (Dr. Kathy Larson, University of Saskatchewan).

COMPLETE

Project 2: Virtual Fencing (VF) for Real-Time Flexible Control of Grazing Beef Cattle. Given the widespread nature and high cost of fencing, strategies to reduce fencing costs have the potential to greatly decrease the cost of beef production, as well as improve the adaptive nature of managing grazing patterns in space and time. The study found that cattle can readily learn and be compliant with VF boundaries, and that VF technology can be used to facilitate rotational grazing through the remote movement of cattle among virtual paddocks. Overall, these findings support VF's potential to enhance cattle management flexibility and control forage use, thereby providing an innovative 'fenceless' tool to balance ongoing pasture use with grassland sustainability. (Dr. Edward Bork, University of Alberta).

COMPLETE

Project 3: Remote Inspection and Grading Pilot Project could enable some staff to work remotely by leveraging computer vision and imaging technologies. The ongoing global shortage of veterinary personal and other specialists required for food inspection tasks in meat plants has increased pressure to use existing staff more efficiently. This research, conducted with the assistance of the Canadian Food Inspection Agency (CFIA) and industry partners, was designed to provide an initial perspective on the feasibility of remote postmortem inspection of for organs on the red offal line (head, heart, lungs, kidneys, and liver) and beef carcasses on the held rail (CCA, CFIA).

IN PROGRESS

Project 4: Remote Ante- and Postmortem Meat Inspections Using Augmented-Reality Live-Stream Video Software is particularly important with rural labour shortages. Developing and validating ways to remotely inspect live animals, carcasses and organs would help small, remote abattoirs continue to operate when onsite inspectors are unable to attend in-person (Dr. Argenis Rodas-González, University of Manitoba).

7. People's Health and Safety



2030 Canadian Beef Industry Goals:

- Create a culture of health and safety across the beef industry supply chain.
- Reduce serious, fatal and fatigue-related incidents by 1.5% per year up to 2030, by supporting education, awareness and improvements in farm and ranch safety.

7.1 Collaborate regarding on-farm health and safety awareness and best practices implementation.

This action item includes supporting knowledge sharing, training, and farm safety planning. It also includes initiatives that addressed workload, labour, and mental health considerations, while promoting the adoption of new technologies.

Relevant CRSB Research Priorities and Recommendation:

- Support the monitoring of farm health and safety; including accident rates and communication on ways to prevent fatalities.

What's Being Done:

There were 16 projects submitted under this action item. These initiatives focus on strengthening on-farm health and safety systems by improving access to practical tools, expanding mental-health supports, and generating data that helps identify risks and trends across the sector.

IN PROGRESS

Project 1: The Canadian Agricultural Injury Reporting (CAIR) program is a national program with collaborators in each province. This surveillance program has filled an important void in providing national evidence of agricultural injury occurrence that can be used in developing and targeting effective injury-prevention strategies. The 2030 report is in progress (Canadian Agricultural Safety Association, CASA; 2030 report).

COMPLETE

Project 2: Canada FarmSafe Plan helps farmers develop a safety program to ensure the health and safety of everyone who lives, works on, or visits their farm. It includes step-by-step guides, sample policies and checklists that make up the foundation of a safety program (CASA).

IN PROGRESS

Project 3: Third National Survey of Farmer & Rancher Mental Health invites farmers and ranchers from all commodities and regions to share their experiences related to stress, anxiety, depression, burnout, resilience, and coping. The results will provide updated insights into mental health in agriculture and will be compared with findings from national surveys conducted in 2016 and 2021, helping identify trends over time (Dr. Andria Jones, University of Guelph and Canadian Centre for Agricultural Wellbeing).

ONGOING

Project 4: CreatingConnections™ focuses on worker and animal safety, through online training on low-stress handling, combined with best practices and innovative concepts, reducing disease, accidents with cattle and economic losses (Merck Animal Health).

7.2 Enable dialogues regarding health and safety, including mental well-being, for all beef value chain participants.

Relevant CRSB Research Priorities and Recommendation:

- Support research and extension efforts into mental health and wellbeing of producers, farm employees, and veterinarians.

What's Being Done:

There were 13 projects submitted under this action item, creating spaces, tools, and opportunities for open dialogue about safety, stress, and mental wellbeing across the beef value chain. While awareness is improving, there is still a need to drive uptake and practical implementation of both mental health supports and broader safety best practices on farms, and continued efforts are needed to ensure these resources are consistently used in day-to-day operations.

ONGOING

Project 1: Canadian Agricultural Safety Week (CASW) is an annual campaign held the third week of March of each year, sharing information and resources to keep farming operations safe, healthy, sustainable and successful (CASA, Government of Canada).

ONGOING

Project 2: The Hay Are We Okay? Podcast inspires rural agricultural communities with ideas and stories of what communities across Canada and around the world are doing to build awareness, action, and supportive culture change for mental health (The Do More Agriculture Foundation).

ONGOING

Project 3: Online Farm Safety Courses include Agricultural Machinery Safeguarding, Seasonal Agricultural Workers Health and Safety Orientation, Working in Confined Spaces on the Farm (CASA).

7.3 Promote a culture of diversity, equity, inclusion and transparency for all people within the beef supply chain.

What's Being Done:

There were five projects submitted under this action item. These initiatives focus on supporting inclusive access to mental-health and safety resources, strengthening transparent communication, and reinforcing respectful, supportive environments across the beef value chain. This item is complemented by additional projects under other People's Health and Safety action items above that advance inclusion and transparency.

IN PROGRESS

Project 1: The Producer Mental Wellbeing Initiative is seeking collaborative solutions that employ novel strategies to promote mental wellbeing and/or address stressors contributing to mental health challenges among producers in Canada. Proposals must consider the unique challenges faced by producers across the country, including youth, women, Indigenous, and equity deserving famers (Agriculture and Agri-Food Canada).

8. Animal Care



2030 Canadian Beef Industry Goals:

- Ensure the five freedoms by increasing adoption of on-farm BMP's:
 - Attain 92% reproductive efficiency in Canadian beef production (85% in 2018).
 - Adopt management and breeding choices that support animal welfare (e.g. calving ease, polled genes, pain relief).
- Establish and maintain a surveillance system to monitor production practices.

8.1 Increase communication and coordination between all stakeholders to ensure animal health and welfare at every stage of the beef cattle life cycle.

This action item includes record-keeping tools that improve information sharing, support informed management decisions, and enhance animal welfare, performance, quality, and sustainability outcomes.

What's Being Done:

There were 20 projects submitted under this action item. Submissions support animal health and welfare through improved disease prevention, early-life management, diagnostics, record-keeping, emergency response, and stewardship practices. However, relatively few projects span the entire beef supply chain from cow-calf through processing, and coordination across production stages remains limited. There is still a need for stronger linkages between sectors to reduce information gaps, improve continuity of animal care, and avoid working in silos.

COMPLETE

Project 1: The Western Canadian Animal Health Network (WeCAHN) Beef Network is a collaborative initiative where veterinarians and other experts can share and discuss animal disease data, emerging animal health events, disease treatment and management strategies, and other current surveillance issues. This project illustrated how a well-coordinated surveillance network, supported by diverse expertise and funding, contributes to better disease management, risk mitigation, and industry sustainability. Having sustainably funded surveillance programs allow for the breaking down of silos to better respond to emerging disease and improve the overall welfare of western Canadian cattle (Dr. Yanyun Huang, Prairie Diagnostic Services).

COMPLETE

Project 2: The Value of Record Keeping for Decision-Making on Canadian Cow-Calf Farms and Ranches project determined which production and financial records are currently being kept by cow/calf producers, how the records are being used to make management decisions, and what economic value has been gained from using the records to make decisions (Dr. Eric Micheels, University of Saskatchewan).

8.2 Promote animal care awareness and implementation of practices through the dissemination of the Code of Practice for the Care and Handling of Beef Cattle.

What's Being Done:

There were 18 projects submitted under this action item. The submissions include improving animal care practices, welfare outcomes, and on-farm decision-making across the beef value chain. They cover a wide range of topics, from calf health and vaccination strategies to feedlot welfare and fencing infrastructure. This item is complemented by additional projects under other Animal Care action items.

Project 1: Assessment of Animal Condition and Welfare Outcomes to Improve Timely Euthanasia in Feedlot Cattle will help refine and validate a euthanasia protocol for commercial feedlots. The Code of Practice for the Care and Handling of Beef Cattle calls for timely euthanasia, when needed, and provides guidelines about how to do it properly. However, the euthanasia decision-making process often isn't clear for employees. The end goal is to develop a producer decision tree to identify animals with poor prognosis that justifies euthanasia. (Dr. Karen Schwartzkopf-Genswein, Agriculture and Agri-Food Canada).

Project 2: The Canadian Cow-Calf Health and Productivity Enhancement Network (C3H/PEN) is a national "living laboratory" of 150 cow-calf herds designed to generate timely, regionally-relevant data to improve herd health, productivity, and economic resilience. The project examines the diversity of cow-calf management systems across Canada and collects detailed information on reproductive performance, winter feeding practices, pre-weaning calf survival, production-limiting diseases, animal welfare, biosecurity, and antimicrobial use and resistance (Dr. Cheryl Waldner, University of Saskatchewan).

8.3 Promote awareness of best practices for animal handling with respect to transport.

What's Being Done:

There were four projects submitted under this action item; however, the project below is best aligned.

Project 1: Effect of Rest Stop Duration and Quality on the Behaviour and Welfare of Cattle Transported by Road found that rest stops did not provide any clear benefit to the health or welfare of the calves during the trip and did not improve health or growth performance during the first month in the feedlot. Other results included calves preferring shorter trips and preconditioned calves travel better than freshly weaned calves (Dr. Karen Schwartzkopf-Genswein, Agriculture and Agri-Food Canada).

8.4 Support research, innovation and knowledge transfer regarding animal care protocols and products.

This action item includes pain control products and protocols, technology for early detection of disease and welfare related to transport.

Relevant CRSB Research Priorities and Recommendation:

- Support research and technology transfer of pain mitigation practices addressing painful procedures.

What's Being Done:

There were 92 projects submitted under this action item, making it the most active area of work across the Sustainability Strategy. Submissions covered a wide range of topics including (35) Bovine Respiratory Disease (BRD), (25) antibiotic and antimicrobial alternatives/stewardship, (22) diagnostics, sensing, and early disease detection, (9) animal welfare and pain mitigation, (12) nutrition and immune development.

Project 1: Development of early-life enrichment programs to improve health and productivity of beef cattle is to design optimal and practical early-life vaccination and weaning programs for beef cattle to improve health, welfare, and productivity and reduce the need for antibiotic treatment. The beef industry has (and continues) to rely on the use of vaccines and antibiotics to control bovine respiratory disease (BRD) and other diseases in cattle production. Early-life management can play a key role in priming the immune systems of calves to strengthen their ability to withstand BRD (Dr. Nilusha Malmuthuge, Agriculture and Agri-Food Canada).

Project 2: Rapid characterization of the viral microbiome in arriving feedlot calves used metagenomic sequencing to study the diversity, prevalence and dynamics of respiratory viruses early in the feeding period, with the goal of identifying vaccination gaps and determine how these viruses may predispose feedlot calves to subsequent clinical bovine respiratory disease (BRD). Metagenomic sequencing and bioinformatics protocols offer diagnostic laboratories a feasible, faster, and less expensive alternative to detect both respiratory viruses and bacterial BRD pathogens compared to traditional tests. The research greatly improved our understanding of the diversity, prevalence and dynamics of respiratory viruses and bacteria early in the feeding period (Dr. Cheryl Waldner, University of Saskatchewan).

Project 3: An “omics” approach to characterization of the microactome and identification of new therapeutic targets for the prevention of liver abscesses and bovine respiratory disease in feedlot cattle. Liver abscesses and bovine respiratory disease (BRD) cause the greatest disease-associated economic losses in the Canadian beef industry. As these conditions are mainly caused by Gram-negative bacteria, this combined with antimicrobial resistance (AMR), may account for the limited efficacy of current antimicrobials. This project will use “omic” technologies to characterize the interaction between these disease-causing microbiomes and the host in a relationship defined as the “microactome” (Dr. Tim McAllister, Agriculture and Agri-Food Canada).

Project 4: Roller Compacted Concrete (RCC) as Suitable Liner of Livestock Pens. When properly designed, installed, compacted, and cured, RCC can meet hydraulic conductivity requirements for use as a primary pen liner in feedlot pens to protect groundwater resources. Use of RCC showed improvements in cattle health, welfare and growth performance while contributing to greater operational efficiency in pen management (Alberta Cattle Feeders’ Association).

8.5 Communicate the importance of adoption of pain control protocols and products.

What's Being Done:

There were seven projects associated with this action item; however, only three directly evaluate specific pain-control products or protocols. The other submissions were more over-arching regarding animal care, and the majority are highlighted throughout the report in other sections.

COMPLETE

Project 1: Comprehensive evaluation of the effect of extended-term delivery of local anesthetic on mitigating the pain caused by castration suggested that lidocaine-loaded elastration bands succeeded at releasing lidocaine into the scrotal tissue, but with moderate effects on reducing acute and chronic signs of pain due to band castration (Dr. Diego Moya, University of Saskatchewan).

COMPLETE

Project 2: What Canadian Cow-Calf Producers Are (and Aren't) Adopting is an updated report outlining national trends in management practices and performance on Canadian cow-calf operations. Using data from the 2022–23 Canadian Cow-Calf Survey, Census of Agriculture, and multiple academic studies, the report highlights adoption patterns for 31 practices across key areas such as reproductive management, calf health, herd management, pain control practices, environmental stewardship and record-keeping. There is opportunity to communicate these insights and translate them into practical guidance for producers (BCRC).

8.6 Improve genetic selection tools that support animal welfare, while considering environmental or productivity benefits.

This action item includes supporting data-driven genetic decisions throughout the beef production chain.

What's Being Done:

There were 14 projects submitted under this action item. Submissions focused on expanding and refining the genetic and genomic tools available to beef producers, whole-herd selection platforms, heifer-selection strategies, and decision-support tools.

COMPLETE

Project 1: Herd DNA pooling tool: using DNA pooling for breeding management in commercial cow-calf herds aimed to validate a low-cost DNA tool, estimated at 1/10th of the typical cost, to monitor herd-level genomic breed composition, retained heterozygosity, and sire contribution using DNA pooling. Results of this project play a role in improving economic net returns, improving herd health and resilience, and reducing carbon footprint. Properly designed crossbreeding strategies that optimize hybrid vigour in the cowherd are known to improve fertility, stayability, adaptability, general health, and lifetime productivity (Dr. John Basarab, University of Alberta).

IN PROGRESS

Project 2: Leveraging genomic technology and collaborative producer education to support better heifer selection programs for the Canadian cow herd. There is a significant industry need to connect data from beef production sectors together to achieve an effective tool towards genetic improvement.

The collaborators involved in this project strongly believe that the most effective tool that can be achieved by leveraging data from the seedstock and commercial sectors of the Canadian beef industry is a robust genomic selection tool to enable information heifer selection decisions (Canadian Angus Association – Dr. Kajal Latimer, *in-progress*).

COMPLETE

Project 3: Development and Demonstration of a Genomics-Enhanced Whole Herd Genetic Management Platform to improve Beef Production Efficiency and Quality. The web-based platform created through this project allows beef producers to access customizable genetic data and selection tools easily, and has been utilized by 88 producers over the course of the project, accounting for over 10,000 cattle. The economic benefits of implementing these genomic tools have been validated by collaborative projects using independent industry beef cattle data, demonstrating that the platform enables commercial beef producers to select and breed beef cattle with their available genetic information to improve production efficiency and quality (Dr. Changxi, Agriculture and Agri-Food Canada).



9. Antimicrobial Use



2030 Canadian Beef Industry Goal:

- Ensure the effectiveness of existing and future antimicrobials is preserved to support human and animal health and welfare.

Relevant CRSB Research Priorities and Recommendation:

- Advance monitoring of antibiotic use and responsible management.

9.1 Build shared understanding for the importance of balanced health for people, animals and the environment in regard to antimicrobial use in beef cattle.

This action item includes development of a database to measure and monitor antimicrobial use and resistance. It also includes development, dissemination and implementation of best practices regarding antimicrobial use.

What's Being Done:

There were 19 projects submitted under this action item. Topics included expanding antimicrobial use and antimicrobial resistance surveillance, advancing bovine respiratory disease (BRD) prevention strategies, improving diagnostic accuracy, and providing tools.

ONGOING

Project 1: Canadian Feedlot Antimicrobial Use and Antimicrobial Resistance Surveillance Program (CFAASP) is a national surveillance program that collects data and monitors trends in antimicrobial use in feedlot cattle and antimicrobial resistance in bovine respiratory pathogens and enteric bacteria. AMU/AMR Surveillance in Canada's beef industry supports a One Health Approach to antimicrobial stewardship (CFAASP).

ONGOING

Project 2: Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS): Beef Feedlot Antimicrobial Resistance Surveillance is a national integrated surveillance program which is coordinated by the Centre for Foodborne, Environmental and Zoonotic Infectious Diseases and the National Microbiology Laboratory of the Public Health Agency of Canada in collaboration with federal, provincial, and private industry partners. CIPARS collects, analyses, and communicates trends in antimicrobial use and in antimicrobial resistance for select bacteria from humans, animals, and retail meat across Canada (Public Health Agency of Canada).

9.2 Promote the importance of veterinarian-client-patient relationship (VCPR) regarding responsible antimicrobial use.

What's Being Done:

There were 13 projects submitted under this action item. Submissions focused on responsible antimicrobial use, tools, diagnostics, and vaccine strategies.

COMPLETE

Project 1: Antimicrobial Use and Resistance in Cow-Calf Herds: Will Anything Change After the Switch to Prescription-Only Sales of Medically Important Antimicrobials? Since December 2018, Canada's cattle producers have required a valid veterinarian-client-patient relationship and a veterinary

prescription before they can obtain antibiotics for their cattle. The study found that there have been very minimal changes to antimicrobial use practices. Both producers and veterinarians recognize the importance of proper antimicrobial use practices and the impact of antimicrobial resistance in their herds, and to the industry as a whole (Dr. Cheryl Waldner, University of Saskatchewan).

COMPLETE

Project 2: Early Calf Health and Survival Management Risk Assessment Tool can effectively be used by veterinarians and cow-calf producers to guide decisions about management practices to improve calf health and survival. Providing tools to both veterinarians and producers to give them easy access to pertinent information and facilitate discussions about effective management practices for individual operations helps improve cattle health, welfare, and productivity (Dr. Claire Windeyer, University of Calgary).

9.3 Support understanding of the importance of antimicrobials as a proven science-based tool in the beef industry to ensure animal care.

This action item includes supporting research on antimicrobial use including opportunities to reduce use and explore alternative approaches. It also includes efforts to improve producer understanding and adoption of best practices, while enhancing public and policymaker understanding of the role of responsible antimicrobial use in sustainable beef production.

What's Being Done:

There were 39 projects submitted under this action item, as this action item captures much of the work being done in the antimicrobial space. There is a large industry focus on antimicrobial research and ensuring they're effective as possible, deepening understanding of when, how, and why antimicrobials are needed to protect animal health, while also addressing the risks of antimicrobial resistance.

IN PROGRESS

Project 1: Genomic ASSETS (Antimicrobial Stewardship Systems from Evidence-Based Treatment Strategies) for Livestock is developing genomic tools and strategies to field-test groups of calves for disease and antibiotic resistance. Goals of the research include: 1) diagnostic workflows using cutting-edge, commercially available genomic platforms, 2) animal sampling and testing for practicality, compatibility with feedlot practices and utility of resulting information and 3) dynamic risk assessment tools (Dr. Lianne McLeod, University of Saskatchewan).

IN PROGRESS

Project 2: Enhancing Respiratory Health of Beef Cattle Through Modulation of Innate Immunity, Analysis of the Resistome, and Identification of Culturable Bacteria is trying to develop alternatives to antibiotic mass-treatment of feeder cattle for BRD. Finding ways to cost-effectively prevent BRD while using fewer antimicrobials will help slow the rate of antimicrobial resistance, maintain the effectiveness of antibiotics, and demonstrate the beef industry's commitment to sustainability (Dr. Trevor Alexander, Agriculture and Agri-Food Canada).

SECTION 4

ECONOMIC

- Producer Viability
- Consumer Resilience & Demand





Section 4: Economic

The Economic Assessment of the 2024 NBSA indicated that sustainability of the Canadian beef industry has undergone many supply and demand shocks including the COVID-19 pandemic and widespread severe drought in 2021. The resilience and ability to shift according to market conditions resulted in increased off-farm income and a growing feedlot sector despite high feed prices. Inflationary pressures have increased the cost of inputs faster than cost of outputs, but consumer demand here in Canada and globally for protein remains strong with a preference for high-quality beef.

As progress continues through economic indicators, the following section highlights the projects and initiatives that help support this work.

10. Producer Viability



2030 Canadian Beef Industry Goal:

- To increase the financial viability of beef production in Canada.

Relevant CRSB Research Priorities and Recommendation:

- Support technology transfer that increases the uptake of sustainable production practices that are aligned with the Certified Sustainable Beef Framework indicators.

10.1 Support increasing producer financial literacy and viability.

This action item includes encouraging initiatives that support the development of business plans and business risk management for farm businesses.

What's Being Done:

There were 22 projects submitted under this action item. Many initiatives focus on specific production practices across beef production systems, including nutrition, grazing management, producer tools, forage production and environmental performance. Selected projects illustrate overarching contributions.

Project 1: Canadian Cost of Production (COP) Network 2023-2028 The COP Network will confidentially gather regionally-relevant producer-level information around on-farm economic realities related to opportunities and barriers regarding production practice change and technology adoption. Groups of comparable operations will serve as benchmark scenarios to help producers to understand the operational goals and the cost:benefit of (and barriers to) adopting practices that interest them. Focus groups will follow up on previous “future farm” scenarios and additional future farm scenarios will be created. These scenarios will evaluate the whole-farm impacts of adopting improved production practices on their operation that could reduce input costs or increase the value of their production by 5% (Brenna Grant, CanFax).

Project 2: University of Manitoba BCRC Chair in Beef Cattle Economic Sustainability to focus on viable solutions for Canadian beef cattle producers with innovations that improve economic sustainability

while reducing environmental footprint. The BCRC Chair will advance research around innovative financial incentive models, analyze the behavioral drivers behind the adoption of BMP's, and work closely with producers, policymakers, and researchers to ensure findings are translated into actionable strategies. The position will also play a key role in training the next generation of agricultural economists and extension specialists (University of Manitoba, BCRC).

10.2 Encourage financial incentives for beef producers related to ecosystems goods and services provided by the beef industry.

This action item includes collaborating with producers, supply chain partners and policymakers to develop programs that are credible, deliver economic value to producers for sustainable practices, and support continuous improvement in ecosystem benefits.

Relevant CRSB Research Priorities and Recommendations:

- Assess the economic feasibility and acceptance of various BMPs for different production systems across Canada.
- Quantify the value of natural capital from beef production.

What's Being Done:

There were 17 projects submitted under this action item, largely focused around grassland management, economic sustainability, and producer decision-making.

IN PROGRESS

Project 1: Estimating the Cost of Providing Ecosystem Goods and Services on Prairie Grasslands. Most beef producers maintain some form of ecosystem goods and services (EGSs) on their operations. Protecting or maintaining EGSs sometimes requires reductions in potential revenue due to management decisions. This project will provide useful information for producers to understand the cost and tradeoffs of maintaining EGSs on their land and could be used in future conversations with policy makers and NGOs about the value of this type of service (Dr. Hayley Hesseln, University of Saskatchewan).

IN PROGRESS

Project 2: Economic assessment of native species adoption in prairie grasslands: From identifying barriers to modelling solutions. Maintaining or expanding the area covered by grasslands is necessary for the sustainability of the cattle industry but requires an improved accounting of the broader benefits they provide society in addition to forage production. This includes non-market ecosystem services such as carbon sequestration, pollination, pest control, biodiversity conservation, and conservation of culturally important species and landscapes. This study will use a combination of stakeholder engagement meetings and producer surveys to better understand the barriers to native species adoption. Additionally, it will use a variety of economic techniques – focusing on land valuation, carbon valuation, and consumer willingness-to-pay – to better value the ecosystem services provided by grasslands and stewarded by livestock producers (Dr. Patrick Lloyd-Smith, University of Saskatchewan).

IN PROGRESS

Project 3: The Evaluation of Stocking Rate, Grazing Duration and Recovery Times on Native Grassland: Impact on Forage Production, Livestock Production, and Economics study is looking to determine how stocking rate and grazing duration impact forage production, livestock performance and economics to identify the best rest-recovery times for native grasslands. The proposed project will add critical animal-level data to fully understand the impact of grazing management on both cattle and native grassland

productivity. This will be one of the first ever projects to link animal level data and grazing management with their impact on the soil microbiome, plant-soil feedback, and GHG emissions (Dr. Breeanna Kelln, University of Saskatchewan).

IN PROGRESS

Project 4: Best Management Practices for Converting Marginal Farmland aims to identify options to restore or convert economically marginal farmland, evaluate technology that can aid implementation, identify operational implications, and assess the economic benefit for each option. This project brings value to producers to identify strategies to manage marginal farmland based on the observed environmental factors and showcase how producers can increase their per-acre-profitability while bettering environmental sustainability (Olds College Centre for Innovation, Farm Credit Canada).

10.3 Support innovation, research, refinement and commercialization of technologies throughout the supply chain that support economic viability and worker conditions.

What's Being Done:

There were 21 projects under this action item, which included a wide range of practices throughout the supply chain. Projects highlighted below include specific technologies being developed to enhance economic viability while reducing workloads.

IN PROGRESS

Project 1: Developing Innovative Laser-Induced breakdown Spectroscopy Technology with Machine Learning Capability for Rapid Analysis of Cereal Grain and Byproduct Composition. Feed testing is essential to ensure cattle quality of cattle feed and help producers develop rations that adequately meet animals' needs. While feed testing is simple to do, it requires samples to be sent to the lab for analysis, resulting in delays in being able to utilize feed properly. This project is the first step to determine if it is possible to develop a handheld feed test tool that could provide rapid, on farm, feed analysis (Dr. Nii Patterson, National Research Council Canada).

COMPLETE

Project 2: Remote Inspection and Grading Pilot Project could enable some staff to work remotely by leveraging computer vision and imaging technologies. The ongoing global shortage of veterinary personal and other specialists required for food inspection tasks in meat plants has increased pressure to use existing staff more efficiently. This research, conducted with the assistance of the CFIA and industry partners, was designed to provide an initial perspective on the feasibility of remote postmortem inspection of for organs on the red offal line (head, heart, lungs, kidneys, and liver) and beef carcasses on the held rail. Results obtained from this pilot exploration suggest that remote approaches to veterinary inspection have potential, with the 82% agreement obtained between CFIA Operational Specialist Unit (OSU) veterinarians and over 90% agreement between OSU and the on-site veterinarian (CCA and CFIA).

IN PROGRESS

Project 3: Remote Ante- and Postmortem Meat Inspections Using Augmented-Reality Live-Stream Video Software is particularly important with rural labour shortages. Developing and validating ways to remotely inspect live animals, carcasses and organs would help small, remote abattoirs continue to operate when onsite inspectors are unable to attend in-person (University of Manitoba – Dr. Argenis Rodas-González, in-progress).

11. Consumer Resilience and Demand



2030 Canadian Beef Industry Goal:

- To increase demand for Canadian beef by building awareness and trust in sustainable beef production in Canada.

Relevant CRSB Research Priorities and Recommendations:

- Quantify the proportion of existing Canadian production sold using niche market attributes, the potential size of these markets, costs and premiums associated with them.

11.1 Support increased capacity of the beef supply chain to respond to market demands.

What's Being Done:

There were eight projects submitted in this area, although selected projects were best suited to the item.

Project 1: The **ThinkBeef** website offers extensive consumers recipes, nutrition information, and free [resources](#) to help ensure a positive experience with beef (Canada Beef).

ONGOING

Project 2: The **'Pick the Beef with the Leaf'** campaign highlights five reasons to choose Canadian Beef: [Supporting](#) Canadian farmers and communities; Delicious and nutritious Canadian beef; Driven by sustainable beef production; Canadian-sourced freshness; and Excellence in beef grading (Canada Beef).

ONGOING

11.2 Support responsible communication of production practices that are of interest and concern to consumers.

What's Being Done:

There were only four projects formally submitted under this action item, although that does not reflect a lack of work being done across the industry and through various associations.

Project 1: **PSE Public Advocacy Guides and Consumer Research** support advocacy efforts in consumer awareness for perception of beef farmers, environment, animal care, safety and nutrition of beef and more. Results from the 2025 Consumer Research indicate that 70% of Canadians have a positive impression of beef farmers, up 7% from 2024, while 25% report a neutral impression, demonstrating continued growth in public confidence and trust in the industry (PSE).

ONGOING

Project 2: The **CRSB Certified™ Program**, developed and operated by the CRSB, is an operation-level certification program that provides third party audited assurances about the production, processing and sourcing of beef through certified supply chains in Canada (CRSB).

ONGOING

11.3 Promote knowledge transfer and acceptance of sustainable and safe beef production technologies by producers, customers, and policymakers, in both domestic and international markets.

What's Being Done:

There were seven projects submitted under this action item, although the selected project is most relevant to the action item.

ONGOING

Project 1: The Canadian Beef Advantage (CBA) differentiates Canadian beef, built around four main pillars: Animal Health, Food Safety, Grading Standards, and Beef Quality. Under these four pillars are core elements of the Canadian Value Proposition, including: cattle identification and traceability, disease surveillance, Hazard Analysis and Critical Control Points (HACCP) standards, grading standards, grain feeding, livestock genetics, producer care and stewardship of the land and water. This core curriculum is tailored to specific trade and consumer audiences to help them learn the overall quality and value of Canadian beef (Canada Beef).

Opportunities for Continued Improvement

This Interim Report provides a snapshot of the work currently captured in the CRSB Projects and Initiatives Database. The gaps identified should not be interpreted as an absence of activity across the Canadian beef industry. Rather, they reflect the 322 projects and initiatives submitted at the time of reporting. It is possible that additional research, initiatives, and investments are underway that were not submitted or otherwise captured through this process. The findings nevertheless highlight areas where additional collaboration, research and investment could advance progress toward the Sustainability Strategy (2024-2030) and Canadian Beef Industry 2030 Goals.

Within the Environment priority area, few projects that were submitted directly addressed manure management practices (2.2) or the measurement and dissemination of the Canadian beef industry's GHG footprint and carbon stocks (2.6). The NBSA helps to fill some of those gaps. While numerous submissions included manure or emissions components, none directly focused on implementation or measured impacts on a more granular scale. There is a lot of work happening in this space that CRSB is aware of, and more project submissions and knowledge-sharing are encouraged on these topics into the future. Water also emerged as an area requiring greater attention, particularly projects focused on water risk assessments (5.4) and innovations that improve water use efficiency within the processing and packaging sectors (5.5).

Food loss and waste (3.2) is another opportunity for improvement with few initiatives directly measuring food waste, reflecting an ongoing challenge associated with the absence of standardized methodology, or exploring packaging solutions that could reduce waste (3.3).

Within the Social priority area, labour management represented one of the smallest areas of activity, specifically initiatives supporting labour availability, recruitment, training, and retention (6.1). Additional opportunities identified were projects that promote diversity, equity, inclusion and transparency for all people within the beef supply chain (7.3). Although animal care is an area of significant activity, opportunities exist to further support awareness of best practices for livestock transport (8.3) and the adoption of pain control protocols and products (8.5).

The greatest opportunity identified through this report is within the Economic priority area. In particular, few projects directly addressed Consumer Resilience with gaps in strengthening the capacity and responsiveness of the beef supply chain to changing market demands (11.1) or improving communication about safe, sustainable beef production technologies with producers, customers, and policymakers (11.3).

Some of CRSB's Research Priorities and Recommendations are yet to be addressed, including those with a focus on collecting, automizing or increasing quality of data. Relevant parameters include feed rations, soil carbon stock, national land use, water risk and water quality indicators. On the consumer level there are gaps in quantifying food waste throughout the supply chain and quantifying Canadian production sold using niche market attributes.

These findings will evolve with continued collaboration among CRSB members and industry partners to improve the collective understanding of where progress is being made, where opportunities remain, and where future activities can have the greatest impact.



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We would like to acknowledge all those who took the time to evaluate their projects against the strategic actions and sub-actions in the CRSB Sustainability Strategy, and for submitting them to the CRSB Projects and Initiatives Database. We look forward to continuing to sharing and spotlighting these projects as a means to further show the immense progress being made by many organizations, researchers and industry stakeholders across the beef value chain.

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Appendix

Table of Strategic Action Items and number of associated projects submitted into the CRSB Projects and Initiatives Database*

1. Sustainability Community	Projects
1.1 Strengthen CRSB's reputation as the trusted organization for beef sustainability in Canada.	3
1.2 Build shared understanding of the balanced health of people, animals and the environment.	18
1.3 Establish and maintain strong relationships, partnerships and communication with the scientific community.	12
1.4 Further engage youth leaders in CRSB's work.	3
1.5 Inform and support information-sharing that advances the sustainability of the Canadian beef value chain.	14
Total	50
2. Environment - GHG & Carbon	Projects
2.1 Encourage research and collaboration to optimize cattle diets	56
2.2 Promote implementation of practices to enhance manure management.	9
2.3 Collaborate with initiatives that work to safeguard carbon storage and increase carbon sequestration.	23
2.4 Collaborate with initiatives that support improvements in feed and forage production.	72
2.5 Collaborate with initiatives that develop genetic selection tools that reduce GHG emissions.	21
2.6 Measure and disseminate the Canadian beef industry's GHG footprint and carbon stock.	9
2.7 Promote communication and knowledge transfer between the research community and producers to increase uptake of practices that reduce GHG emissions and improve carbon sequestration.	23
Total	213
3. Environment - Food Loss & Waste and Carcass Utilization	Projects
3.1 Encourage programs and projects that help food diversion efforts and reduce barriers to implementation.	10
3.2 Further enhance understanding of food loss and waste in the Canadian beef value chain.	11
3.3 Encourage research and adoption of packaging that enhances product life, and reduces food waste and environmental impact while aligning with ongoing national and global initiatives.	5
3.4 Support initiatives to improve carcass quality and utilization.	27
Total	52
4. Environment - Land Use and Biodiversity	Projects
4.1 Support the creation and adoption of ecosystem services payments, markets and producer incentives.	15
4.2 Facilitate collaboration across stakeholder groups to develop a shared understanding of the challenges and potential solutions to promote biodiversity.	18
4.3 Support work that builds understanding and enhances or restores habitat quality and quantity on beef [production] operations.	19
4.4 Build further awareness and use of range health assessments by producers	9
Total	61
5. Environment - Water	Projects
5.1 Build further beef producer understanding, awareness and use of riparian health assessments by supporting organizations that are enhancing awareness and promoting adoption of tools.	7
5.2 Collaborate with stakeholders to further measure the relationship between beef production and wetland conservation, and the associated ecosystem services being provided	6
5.3 Partner with organizations that deliver producer extension to encourage uptake of practices to preserve wetlands.	7
5.4 Build awareness about the limitations in water risk assessments and the importance of local context when interpreting the results, both nationally and internationally.	1
5.5 Support innovation that increases water use efficiency within the processing and packaging sectors.	1
5.6 Support improvement in feed yields/productivity, drought resistance and irrigation practices to reduce the blue water footprint of feed.	14
Total	35

6. Social - Labour	Projects
6.1 Support initiatives that increase labour availability, training, recruitment and retention.	5
6.2 Promote implementation of practices to enhance labour management.	13
6.3 Support adoption of best management practices, business tools and new technology to reduce workloads across the beef supply chain, focusing particularly on family farm businesses, while considering the practicality of implementation.	12
Total	30
7. Social - Health & Safety	Projects
7.1 Collaborate regarding on-farm health and safety awareness and best practices implementation.	16
7.2 Enable dialogues regarding health and safety, including mental well-being, for all beef value chain participants.	13
7.3 Promote a culture of diversity, equity, inclusion and transparency for all people within the beef supply chain.	5
Total	34
8. Social - Animal Care	Projects
8.1 Increase communication and coordination between all stakeholders to ensure animal health and welfare at every stage of the beef cattle life cycle.	20
8.2 Promote animal care awareness and implementation of practices through the dissemination of the Code of Practice for the Care and Handling of Beef Cattle.	18
8.3 Promote awareness of best practices for animal handling with respect to transport.	4
8.4 Support research, innovation and knowledge transfer regarding animal care protocols and products.	92
8.5 Communicate the importance of adoption of pain control protocols and products.	7
8.6 Improve genetic selection tools that support animal welfare, while considering environmental or productivity benefits.	14
Total	155
9. Social - Antimicrobial Use	Projects
9.1 Build shared understanding for the importance of balanced health for people, animals and the environment in regard to antimicrobial use in beef cattle.	19
9.2 Promote the importance of veterinarian client-patient relationship (VCPR) regarding responsible antimicrobial use.	13
9.3 Support understanding of the importance of antimicrobials as a proven science-based tool in the beef industry to ensure animal care.	39
Total	71
10. Economics - Producers	Projects
10.1 Support increasing producer financial literacy and viability	22
10.2 Encourage financial incentives for beef producers related to ecosystems goods and services provided by the beef industry.	17
10.3 Support innovation, research, refinement and commercialization of technologies throughout the supply chain that support economic viability and worker conditions.	21
Total	60
11. Economics - Consumers	Projects
11.1 Support increased capacity of the beef supply chain to respond to market demands.	8
11.2 Support responsible communication of production practices that are of interest and concern to consumers.	4
11.3 Promote knowledge transfer and acceptance of sustainable and safe beef production technologies by producers, customers, and policymakers, in both domestic and international markets.	7
Total	19

*A total of 322 individual projects were submitted. Many projects contributed to more than one strategic action item, collectively supporting 782 actions across the Sustainability Strategy's four priority areas: Sustainability Community, Environment, Social and Economics.



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