COMPARISON OF SUSTAINABLE BEEF PRODUCTION IN THE UNITED STATES, CANADA AND BRAZIL BASED ON THE GRSB.

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THE PROBLEM

Improving sustainability in beef production, processing, and merchandizing means not only reducing costs and maximizing productivity, but also focusing on environmental implications, animal welfare and social concerns (GRA, 2013).

The GRSB - Global Roundtable for Sustainable Beef is the strategic platform to advance continuous improvement in sustainability of the global beef value chain through multi-stakeholder engagement and collaboration.

Livestock production is increasingly competing for scarce resources, such as land, water, and energy and its emissions can affect severely on air, water and soil quality (De Vries, 2010).

THE PROJECT

The goal of this project is to contribute with the development of methods to assess sustainable beef production analyzing and comparing the current scenario of beef industry in the US, Canada and Brazil based on GRSB principles and criteria. Finally, this project will have some recommendations of what KPI's could possibly be applied to achieve GRSB. goals.

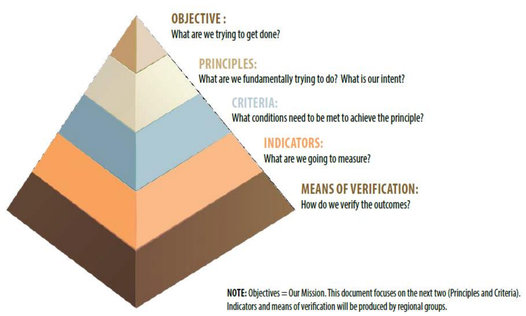


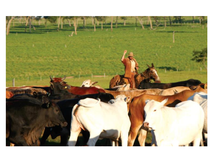
Figure 1: Pyramid of levels adopted and recommended by GRSB. (GRSB, 2014a).

METHODOLOGY

The evaluation of the potential of sustainable beef in the US, Canada and Brazil to achieve the goals of the Global Roundtable for Sustainable Beef (GRSB) is based on Key Performance Indicators (KPIs)recommended according to each beef industry scenario. In table 1, there is all the criteria summarized for each principle defined by GRSB in their Annual Report 2014.

Table 1: Principles and criteria for Global Roundtable for Sustainable Beef summarized (GRSB, 2014a).

Principle	Criteria
1. Natural Resources	1. Environmental stewardship objectives are attained through adaptive management. 2. Improve air quality. 3. Net greenhouse gas emissions minimized on a per unit of product basis. 4. Native forests are protected from deforestation. 5. Land management practices conserve and enhance the health of ecosystems. 6. Water resources 7. Soil health is maintained or improved. 8. Maintenance or enhancement of native plant and animal biological diversity. 9. Where available, feed sources are sustainably produced.
2. People & Community	1. Companies and individuals throughout the beef value chain respect human rights in accordance with the UNGPBHR. 2. Business is conducted with integrity, in compliance with applicable laws and regulations. 3. A safe and healthy work culture is adopted, supported by training and appropriate equipment to reduce the risks to all in the beef value chain. 4. Employment provides for the legal minimum wage and opportunities for career development, where possible, are made available throughout the value chain. 5. The cultural heritage and way of life of all parties are recognized and respected throughout the value chain. 6. Land and property rights are acknowledged and respected throughout the value chain.
3. Animal Health & Welfare	1. Adequate feed and water are provided to meet cattle's physiological needs. 2. Animal caretakers provide cattle with health care. 3. All veterinary pharmaceuticals and vaccines are used responsibly and in accordance with labeling. 4. Appropriate action is taken to minimize undue pain, injury and disease, and to address any of these problems when identified. 5. Good animal welfare is ensured. 6. Cattle are kept in an environment (including stocking density, air quality and surfaces). 7. Transport (by land, sea or air) and handling procedures are consistent with OIE guidelines. 8. Animal welfare procedures at processing plants, including slaughter procedures, are in line with the OIE terrestrial animal health code.
4. Food	1. Food safety. 2. Beef quality. 3. Information should be shared both up and down the value chain. 4. Food waste is reduced throughout the value chain, reusing and recycling wherever practicable.
5. Efficiency & Innovation	1. Cattle are selected and managed to continually optimize available resources and suit their environment. 2. Waste is reduced and opportunities to reuse and recycle are maximized. 3. Product value and carcass utilization are maximized. 4. Water and land resources are managed. 5. Energy use is optimized for efficiency and productivity. 6. Feed and forage use is optimized for production and welfare goals. 7. Pharmaceutical, nutrient and chemical use is executed safely and responsibly. 8. Beef value chain stakeholders continually innovate, and responsibly use technologies and leading practices. 9. Sustainable beef production is enhanced through education, extension and partnerships where appropriate opportunities exist.



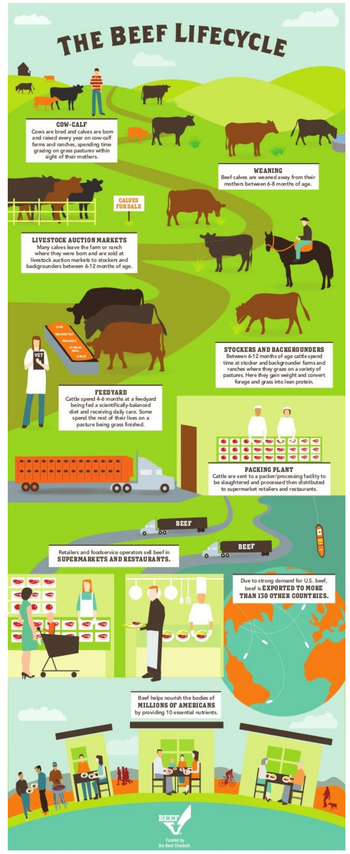


Figure 2: Beef life cycle (NCBA, 2014).

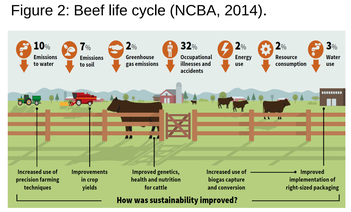


Figure 3: Life cycle of beef (Source: Beef Industry Sustainability Lifecycle Assessment, funded by the beef checkoff).

RESULTS

Beauchemin, 2010; Berndt, 2013; Pelletier, 2010 and Verge, 2008 have conducted life cycle assessment of beef production in those three countries and by looking their results, it was possible to verify if the indicators are applicable to GRSB goals and also identify some good practices of sustainable beef production that could give producers better outcomes.

Table 2: Recommended KPIs to be measured regarding each principle of GRSB.

Principle	United States	Canada	Brazil
1. Natural Resources	Reduce GWP, ODP and AP in more than 3% in more than 5 years	Not considered	Not considered
	Reduce GHG emissions in 15% in 30 years	Reduce GHG emissions in 25% in 10 years	Reduce GHG emissions 38% in 10 years
	Avoid over-grazing and limit damage caused by grazing cattle in grasslands and pasture	Unknown information	Increase forest suppression according to the Brazilian forestry code
	Reduce land use in 30% in 30 years	In development	In development
	Water use in crop yields reduced between 20 and 80% in 30 years	Unknown information	Unknown information
	nutrients excretion about 10% reduction in 30 years	Increase the use of cattle manure as an amendment for soil fertility	Increasing grazing and reduce nutrients excretion
2. People & Community	Reduce occupational accidents by 30% in 5 years. Mainly in the harvesting phase	Use of adequate equipment by employees	Use of adequate equipment by employees
	Increase employment by 25% and minimum wage to same proportion (if applicable).	Unknown information	Increase number of employees registered and provided with social security
3. Animal Health & Welfare	Animals should not suffer from prolonged hunger and thirst	Unknown information	All acquisitions and sales of animals, food and semen, breeding programs, losses and discards, feeding plans, should be recorded.
	Animals should be free of injuries e.g. skin damage and locomotors disorders	Separating, monitoring and observing animals to avoid disease risk	Not considered
	Unknown information	Management of herd health according to a documented Herd Health Plan	Unknown information
	Unknown information	Obtain water, feed, medications, and other inputs from safe and reliable sources	Eradicate or control diseases, which hampers the export of beef with emphasis on foot and mouth disease
	Unknown information	Manage feedstuffs in a way to maintain quality and minimize spoilage	Guarantee fresh water and nutritional care for cattle
	Regarding animal behavior negative emotions such as fear, distress, frustration or apathy should be avoided	Unknown information	Unknown information
	Unknown information	Usage clean trucks to transport animals	Unknown information
4. Food	In development	Evaluation of existing and new intervention strategies and technologies to reduce E. coli	In development
	Epidemiological analysis is needed to both understand the prevalence of acidosis and the risk factors	Evaluation of existing and new intervention strategies and technologies to reduce food-borne pathogens	Carry out studies for improving the quality of beef products and by-products.
	Several technologies are commonly used for either health or management reasons in beef cattle	In development	In development
5. Efficiency & Innovation	Reduce 7% solid waste generation in the pre-chain	In development	Manure waste collected adequately
	Unknown information	Unknown information	Effectively establish a carcass classification system.
	Unknown information	Unknown information	Carry out studies to support the development of animal breeding programs, focusing on early conception, early fattening, adaptability and quality of final product
	Lower fossil energy use	In development	In development
	Unknown information	Support and encourage rapid adoption of innovation to sustain competitive advantage	improve herd genetics and property infrastructure
	Unknown information	Unknown information	Develop campaigns to inform the population on the nutritional value of beef and the healthy nutrition.

SUSTAINABILITY

The sustainable beef production have correlation to all systems of sustainability:

- Natural systems: livestock production has great impacts on the environment such as scarce resources, water, energy and soil quality (De Vries, 2010).
- Social systems: health and safety of products, quality of life of beef industry consumers and improvement of conditions for employees, such as job creation, worker safety, employment security and business ethics (GRA, 2013)
- Built systems: buildings that hold the supply chain of beef production are one of the objects to be assessed in order to identify the opportunities to improve sustainability in the beef industry (Euclides Filho, 2004); also transportation logistics and infrastructure.
- Managed systems: methods of assessments of sustainability in the value chain of beef production, like LCA (De Vries, 2010).

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