

Les Producteurs
de bovins du
Québec



FACT VERSUS FICTION

2nd edition • 2024

Understanding the main criticisms
aimed at beef and veal production
in order to better address them



An information booklet for Quebec cattle producers
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July 2024

Dear Producers,

Just over four years after the initial publication of this booklet, it is my pleasure to be writing the preface to the new edition. The PBQ remains firm in its desire to set the record straight on certain claims made in public discourse, a desire that has guided this undertaking. Consumers and other interested parties can also get the real facts about beef and veal production in Quebec on the lesfaitsboeuf.com | veaufaits.com platform. Like the publication you are reading, it features information based on the latest scientific data.

I firmly believe that sharing the information in this booklet is just as important as ever. Please do not hesitate to share it with those around you.

Sincerely,



Sébastien Vachon
Chairman



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GREENHOUSE GASES

The dominant discourse

“We must cut down on eating beef to fight climate change, to reduce our environmental footprint, and because beef causes pollution (by generating more greenhouse gases [GHGs]).”

The facts

Emissions from beef production in Canada decreased by 17% from 2014 to 2021. In eastern Canada, they decreased by 20.9% over the same period (per kilogram of live weight).¹

How was this accomplished?^{2, 3}

- Lower mortality rates on farms
- Higher productivity (more kilograms of meat per carcass, higher conversion rates, and genetic improvement)
- Using ration produced in Canada
- Using more digestible feed and replacing corn with by-products
- Managing manure more effectively (e.g. through agro-environmental fertilization plans [AEFPs])
- Sequestering carbon through grazing

It is true that...

... cattle farming generally has a larger carbon footprint than that of other animals raised for human consumption.

Did you know?

Canadian beef production has one of the lowest GHG emission levels in the world, at 50% of the global average.⁴



The dominant discourse

“Animal farming emits more GHGs than any form of transportation powered by fossil fuels.”

The facts

While animal farming does generate GHGs, these emissions cannot be compared directly to those from transportation because they are calculated differently.

The figure stating that farming accounts for nearly 12% of global GHG emissions was calculated using the life cycle method. This means it includes all emissions generated from the time the animals are born to when the end product is sold to consumers.⁵

The global inventory of GHGs associated with transportation is estimated at 15% (with the latest figure dating from 2019).

It does not account for any other GHG emissions involved (such as those from extracting the raw materials used in manufacturing).⁶

GHG emissions and capture in cattle production



Did you know?

According to inventory data for Quebec, cattle production as a whole is responsible for 1.2% of GHG emissions, as compared to 42% for transportation.⁷



WATER MANAGEMENT

The dominant discourse

"It takes 15,000 L of water to produce 1 kg of beef, and cattle production pollutes rivers and streams."

The facts

- The figure above includes all types of water involved⁸ :

Green
water
94 %

Water in the soil that is available to plants (rainwater, snowmelt, etc.)

Blue
water
3 %

Surface and underground water, drinking water, irrigation water, water used in abattoirs

Gray
water
3 %

Water used to treat polluted water

According to international standards, only blue water should be considered in this context.^{1, 9, 10}

The facts

- Data from recent studies indicate that the amount of blue water needed to produce 1 kg of consumer-ready beef in eastern Canada is 432.7 L.¹

From 2014 to 2021, the amount of water consumed in cattle farming fell by 42.9% to 89.9 L per kg of live weight in eastern Canada.

This stands in stark contrast to the American figure of 1,214 to 1,748 L per kg of live weight.

Pasture-based farming in Quebec does not require any irrigation to water forage plants, while the amount of irrigation required to grow the grains used in livestock feed is minimal. This lowers the usage of water resources.¹

- In Quebec, it is mandatory (under the Agricultural Operations Regulation) for farmers to prevent any runoff that poses a risk to rivers and streams when storing and spreading manure.¹¹

It is true that...

... in the context of climate change, irrigation needs may increase both in Quebec and in the rest of Canada in the coming years.¹²

... the leading sources of contamination in rivers and streams identified by the Ministère de l'Environnement et de la Lutte contre les changements climatiques of Quebec are municipal wastewater discharge and the spreading of liquid and solid manure from all types of livestock production. It should be noted, however, that significant progress has been on this front since 2014 in cattle production.^{1, 13}



Did you know?

It takes about 3,158 L of water (mostly for irrigation) to produce 1 kg of almonds.¹⁴



Did you know?

Only 3% of the water needed for cattle farming comes from the same sources as the water people drink in their homes.⁸

SOIL MANAGEMENT AND LAND USE

The dominant discourse

“Eating meat contributes to deforestation and land degradation. Livestock farming takes up land that could be used to feed people.”

The facts

- Much of the land used to raise cattle is unsuited to growing crops for human consumption.¹
- Cattle are able to turn foods that would otherwise end up in a landfill (e.g. leftovers from food processing plants, brewers' spent grain) into nutritious and delicious meat. This reduces food waste without threatening the animals' health.¹⁵
- Beef and veal producers have lowered their need for farmland by changing what goes into their animal feed and by increasing crop yields.^{1,2}
- Beef and veal farming in Canada is not a significant contributor to deforestation.¹⁶
- Logging is strictly regulated in Quebec.¹⁷

Did you know?

Cattle farming accounts for 40% of agricultural land area in Canada.

The vast majority (84%) of this land is devoted to grazing. Only 8% is needed to produce the grains used in cattle feed (corn, barley, wheat, soybeans, etc.).¹



What is permanent grassland?

Permanent grassland is a herbaceous plant cover which has been settled for a number of years. It is characterized by a great variety of spontaneous plant species in an ecological balance under the combined effect of the environment and agricultural practices. These are essential for its sustainability (fertilization, grazing and mowing). It differs from sown grasslands by the absence of tillage and the limitation of phytosanitary products, which preserves the soil's life and the numerous animal species it shelters (Government of Canada).

It is true that...

... raising animals on pasture preserves permanent grassland.²

... the impact of livestock farming on soil can be reduced through proper manure management, water protection, and monitoring by agronomists.

... cattle eat corn. However, 86% of their total diet consists of foods that would be unsuitable for human consumption.¹⁸

Did you know?

Thanks to higher feed efficiency, the amount of land needed to produce one head of beef cattle went down by 38.6% between 1981 and 2021 in eastern Canada.¹⁹



38%



BIODIVERSITY

The dominant discourse

“Livestock farming threatens biodiversity.”

The facts

- Practices used by Quebec beef farmers that promote biodiversity were documented for the first time in a survey of cattle producers conducted in 2023.
- Among other things, the survey showed that nearly 80% of respondents who have pastures or grasslands practice pasture rotation, a regenerative technique that improves soil health and maintains biodiversity.
- Over half of producers surveyed also have birdhouses, bat boxes, or beehives on their farms.
- Some farmers even plant trees, alter their hay mowing techniques to protect birds, and/or participate in nature conservation efforts.
- Permanent grasslands promote biodiversity.
- At least 545 species of terrestrial vertebrates feed and/or reproduce in Canadian pastures.³
- The capacity of land associated with the cattle industry to provide habitat for terrestrial vertebrate species increased between 2014 and 2021.



Did you know?

Pastureland provides 74% of the habitat needed by wild animals for reproduction and 55% of the habitat they need for feeding. The presence of cattle plays an important role in preserving their ecosystem.³

It is true that...

... sustainable soil management practices (pasture rotation, grazing management, grassland regeneration, etc.) help maintain plant species.²⁰



Canada's cattle industry has a dedicated research organization that plays an active role in continuously improving beef production across the country.²¹



Did you know?

The Verified Beef Production Plus (VBP+) program allows producers to demonstrate that they follow best practices when it comes to the environment.²²



ANIMAL WELFARE

The dominant discourse

“The animal industry murders animals. It is cruel to kill animals for food when vegetarian options are available.”

The facts

- Slaughter is highly regulated in Quebec and the rest of Canada, which limits the suffering and distress of animals.^{23, 24}
- Inspectors ensure slaughter procedures are followed correctly.^{23, 24}
- All living organisms will eventually die or be killed so that others may live.

It is true that...

... eating meat is not a cruel or unethical act; it is a natural part of the cycle of life.

... the positions of people who oppose raising animals for meat are often irreconcilable with those of producers.

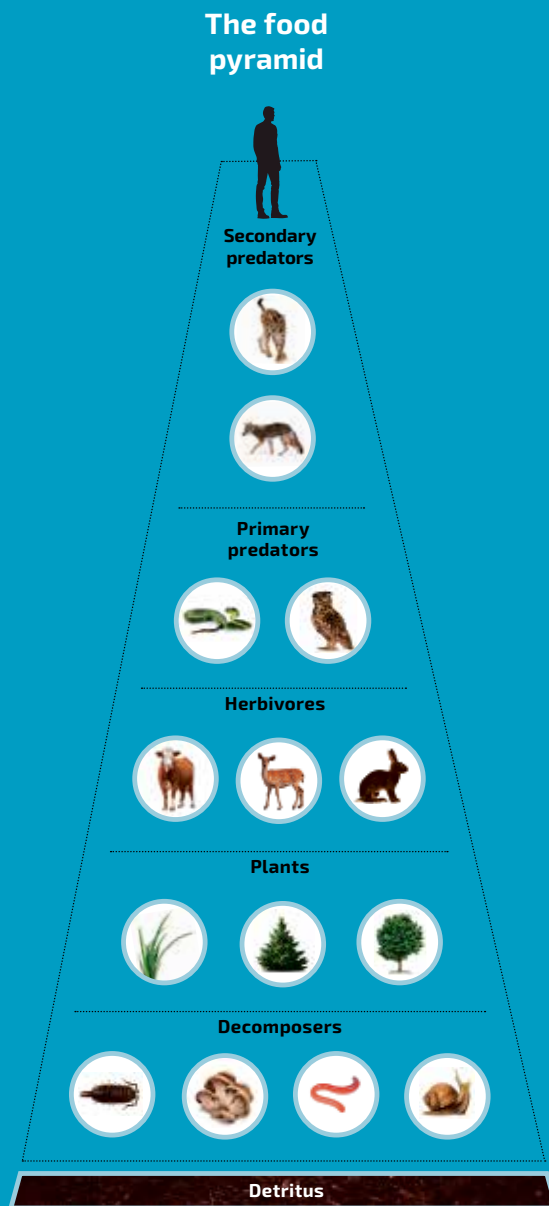
... beef and veal can be part of a healthy diet.²⁵

The dominant discourse

“The animal industry abuses animals. Eating meat causes cruelty to animals, which are viewed as assets as opposed to individual, sentient beings with physical and psychological needs.”

The facts

- There are multiple laws governing animal welfare provincially and federally.
- Quebec is noted for its Animal Welfare and Safety Act, which recognizes animals as sentient beings with biological needs. The Ministère de l'Agriculture, des Pêcheries et de l'Alimentation (MAPAQ) has the ability to lay charges against animal owners who are at fault under the act.
- Codes of practice are available to producers. These codes are developed by consensus between producers, governments, scientists, and animal defence groups.
- Producers must comply with animal welfare requirements, which are set out in their marketing regulations (e.g. VBP+ certification, Quebec Certified Grain-Fed Veal).



Did you know?

The MAPAQ is tasked with enforcing the Animal Welfare and Safety Act, in which it takes a zero-tolerance approach.²⁸

Agronomists and veterinarians are obligated to report situations where animal welfare is not respected.²⁴

A toll-free phone line is available for citizens to report animal owners who are at fault.²⁸

Did you know?

Animal welfare is one of producers' most central concerns:

- The industry has paid special attention to animal care and has achieved tangible, positive results.
- Progress has been made on a number of fronts, especially monitoring health problems, enhancing pain mitigation strategies, training animal handlers, and adapting to warmer temperatures.³



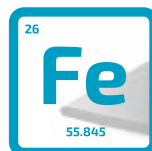
HUMAN HEALTH

The dominant discourse

“Eating red meat is associated with increased risk of cancer and cardiovascular disease.”

The facts

- Meat contains several essential nutrients that are easily absorbed by the body (bioavailable), which makes it an undeniably important part of the human diet.²⁵
- Eating a varied and balanced diet that includes other food groups, such as fruits and vegetables, can reduce the risks and increase the benefits associated with meat.²⁵
- Canada’s food guide recommends choosing foods that are as minimally processed as possible.²⁹



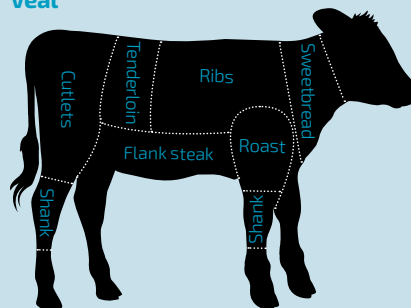


It is true that...

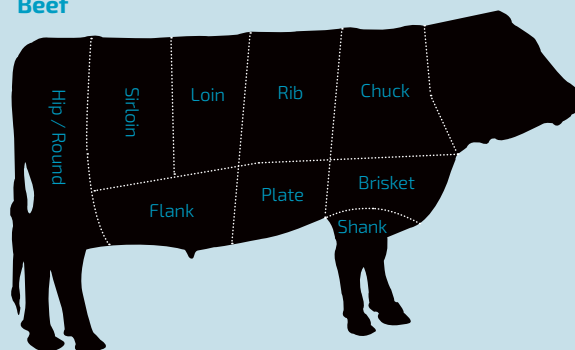
... according to the World Health Organization (WHO), processed meat may carry risk.³⁰

... a reanalysis of existing studies was conducted by a panel of researchers from seven countries and published by the American College of Physicians. The authors did not support the recommendations (based on WHO findings) of certain governments to encourage their citizens to eat less red meat, characterizing the degree of certainty in the supporting studies as “weak.”³¹

Veal



Beef





The dominant discourse

“It is unnatural to use antibiotics to produce meat because they contaminate our food.”

The facts

- Antibiotics are used to treat animals that are ill.
- Antibiotics and hormones (growth promoters) are used under veterinary supervision.^{32, 33}
- Inspectors from the Canadian Food Inspection Agency (CFIA) ensure that producers use the proper withdrawal periods and that carcasses are safe for consumption.³⁴
- More and more producers are participating in certification programs that involve close monitoring of the use of substances containing antibiotics or growth hormones on cattle farms.^{22, 35}
- Antibiotic use and the phenomenon of antibiotic resistance in both animals and humans are closely monitored in Canada; farms, abattoirs, and retailers are inspected by authorities.³⁶
- In Quebec, the preventive use of Category 1 antimicrobials in livestock production is strictly regulated, as these drugs are prioritized for human medicine. In fact, only 0.4% of the antimicrobials in use belong to Class 1.^{37, 38}



It is true that...

... the monitoring practices that have been implemented in Canada's cattle sector are proving successful:

- The sale and use of antibiotics fell by 10.2% in 2022.
- The cattle sector consumes lower levels of antibiotics than other sectors.
- The types of antibiotics sold to humans are different from those sold for animal use.
- Antibiotic resistance decreased in 2022.³⁸

... reasonable use of antibiotics (especially for preventive treatment) and best farming practices are reducing the presence of antibiotic-resistant bacteria.³⁹

Did you know?

Since 1984, any use of antibiotics on Quebec farms must be supported by a prescription from a veterinarian to ensure compliance with authorized practices. Since February 2018, Health Canada has banned all claims of growth stimulation in product labelling of antibiotics for animals to reduce their use for this purpose.⁴⁰



The facts

- There is no such thing as “hormone-free” beef. It is more accurate to describe meat as being raised without added hormones. Animals, humans, and plants all produce hormones naturally.
- The use of hormones in beef production is subject to Health Canada regulations. The CFIA is responsible for overseeing producers’ use of growth hormones. These products require a veterinary prescription.^{32, 33}

Keeping perspective...

The level of hormones found in beef and other foods is too low to pose a risk to human health..⁴¹

It is true that...

... in Canada, growth hormones for cattle are approved for beef production only. They enable leaner meat to be produced at a lower cost.³²





The Quebec Certified Grain-Fed Veal, Verified Veal, and VBP+ programs provide proof that animal health products are used judiciously on farms.



Did you know?

No growth promoters are used in grain-fed or milk-fed veal production.



**75
grams**

of beef from the carcass
of an animal fed growth promoters



**2
nanograms
of estrogen**



**355
millilitres**

of beer



**15
nanograms
of estrogen**

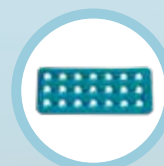


**75
grams**

of raw cabbage



**2 976
nanograms
of estrogen**



**1
single**

birth control pill



**35 000
nanograms
of estrogen**





References

- 1 ABOAGYE, Isaac A., G. VALAPPIL, B. DUTTA, H. IMBEAULT-TÉTREAU, K. H. OMINSKI, M. R.C. CORDEIRO, R. KRÖBEL, S. J. POGUE, and T. A. MCALLISTER. "An assessment of the environmental sustainability of beef production in Canada", Canadian Journal of Animal Science, February 5, 2024. [<https://doi.org/10.1139/cjas-2023-0077>].
- 2 CANADIAN ROUNDTABLE FOR SUSTAINABLE BEEF (CRSB). National beef sustainability assessment: Environmental and social assessment, [Online], 2016. [https://crsb.ca/wp-content/uploads/2021/12/CRSB-EnvironmentalAndSocialAssessments_2016_full-report.pdf] (Accessed June 22, 2019).
- 3 GROUPE AGÉCO. Update to the Canadian roundtable for sustainable beef's national beef sustainability assessment: final report, [Online] April 2023. [https://crsb.ca/wp-content/uploads/2023/11/FULL-REPORT_CRSB-Environmental-Social-Assessment_FINAL.pdf].
- 4 FOOD AND AGRICULTURE ORGANIZATION (FAO). Greenhouse gas emissions from agrifood systems: Global, regional and country trends, 2000–2020, FAOSTAT Analytical Brief 50 [Online], 2022. [<https://www.fao.org/3/cc2672en/cc2672en.pdf>].
- 5 FOOD AND AGRICULTURE ORGANIZATION (FAO). Pathways towards lower emissions: A global assessment of the greenhouse gas emissions and mitigation options from lives- tock agrifood systems, [Online] 2023. [<https://www.fao.org/3/cc9029en/cc9029en.pdf>] (Accessed March 6, 2024).
- 6 CONTRIBUTION OF WORKING GROUP III TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. "Intergovernmental Panel on Climate Change (IPCC, 2022): Climate Change 2022: Mitigation of Climate Change", Cambridge University Press, Cambridge, UK and New York, NY, USA. doi : 10.1017/9781009157926. (Accessed March 7, 2024).
- 7 • GOVERNMENT OF CANADA. Canada's official greenhouse gas inventory, [Online], [<https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html>].
- GOUVERNEMENT DU QUÉBEC. Inventaire québécois des émissions de gaz à effet de serre en 2021 et leur évolution depuis 1990. [Online], [<https://www.environnement.gouv.qc.ca/changements/ges/2021/inventaire-ges-1990-2021.pdf>].
- Statistics Canada.
- 8 LEGESSE, Getahun, et al. (2017). "Water use intensity of Canadian beef production in 1981 as compared to 2011", ScienceDirect. [<https://doi.org/10.1016/j.scitotenv.2017.11.194>] (Accessed May 26, 2019). Calculation based on table 4 on page 1037.
- 9 WATER FOOTPRINT NETWORK. Water Footprint Network, [Online]. [<https://www.waterfootprint.org/water-footprint-2/what-is-water-footprint-assessment/>] (Accessed May 27, 2019).
- 10 ISO, ISO 14046:2014 – Environmental management - Water footprint - Principles, requirements and guidelines. [Online]. [<https://www.iso.org/standard/43263.html>] (Accessed May 27, 2019).

- 11 QUÉBEC. Agricultural Operations Regulation. Chapter q-2, r. 16., updated to January 1, 2024, [Québec], Québec Official Publisher, 2002.
- 12 • MINISTÈRE DE L'AGRICULTURE, DES PÊCHERIES ET DE L'ALIMENTATION DU QUÉBEC. Recherche participative d'alternatives durables pour la gestion de l'eau en milieu agricole dans un contexte de changement climatique (RADEAU1), 2019, 332 pp. [Online] [https://www.agrireseau.net/documents/Document_101346.pdf] (Accessed March 7, 2024).
- AGRICULTURE AND AGRI-FOOD CANADA. Climate change impacts on agriculture: Impacts to Canadian agriculture from climate changes. [Online]. [<https://agriculture.canada.ca/en/environment/climate-change/climate-change-impacts-agriculture#d>] (Accessed March 7, 2024).
- 13 MINISTÈRE DE L'ENVIRONNEMENT ET DE LA LUTTE CONTRE LES CHANGEMENTS CLIMATIQUES. La qualité de l'eau et les usages récréatifs, [Online]. [<https://www.environnement.gouv.qc.ca/eau/recreative/qualite.htm.ca/eau/causes.htm>] (Accessed May 24, 2019).
- 14 88 ACRES. Water footprint of seeds vs nuts, [Online], 2016. [<https://88acres.com/blogs/news/water-footprint-of-seeds-vs-nuts>] (Accessed May 17, 2023).
- 15 DOU, Z., J. D. TOTH, and M. L. WESTENDORF. "Food waste for livestock feeding: Feasibility, safety, and sustainability implications", *Global Food Security*, vol. 17, June 2018, p. 154-161. [<https://doi.org/10.1016/j.gfs.2017.12.003>].
- 16 GOVERNMENT OF CANADA. Deforestation in Canada: Key myths and facts, [Online], 2024. [<http://www.nrcan.gc.ca/our-natural-resources/forests/insects-disturbances/deforestation-canada-key-myths-and-facts/13419>].
- 17 QUÉBEC. Regulation respecting standards of forest management for forests in the domain of the State, updated to April 1, 2018, [Québec], Québec Official Publisher, 1995.
- 18 MOTTET, A., C. DE HAAN, A. FALCUCCHI, G. TEMPIO, C. OPIO and, P. GERBER. "Livestock: On our plates or eating at our table? A new analysis of the feed/food debate", *Global Food Security*, vol. 14, 2017, pp. 1-8. [<https://doi.org/10.1016/j.gfs.2017.01.001>].
- 19 LEGESSE, G., K. A. BEAUCHEMIN, K. H. OMINSKI, E. J. MCGEOUCH, R. KREOBL, D. MACDONALD, S. M. LITTLE, T. A. MCALLISTER. "Greenhouse gas emission of Canadian beef production in 1981 as compared with 2011", *Animal Production Science*, vol. 56, no 3, 2015, pp. 153-168. doi : 10.1071/an15386.
- 20 • RICHTER, F., P. JAN, N. EL BENNI, A. LÜSCHER, N. BUCHMANN, and V. H. KLAUS. "A guide to assess and value ecosystem services of grasslands", *Ecosystem Services*, vol. 52, December 2021. [<https://doi.org/10.1016/j.eco-ser.2021.101376>].
- SOLLENBERGER, L. E., M. M. KOHMANN, J. C. DUBEUX JR, and M. L. SILVEIRA. "Grassland management affects delivery of regulating and supporting ecosystem services", *Crop Science*, vol. 59, no 2, pp. 441-459, March 1, 2019. [<https://doi.org/10.2135/cropsci2018.09.0594>].
- 21 BEEF CATTLE RESEARCH COUNCIL. [Online]. [<https://www.beefresearch.ca/>].
- 22 VERIFIED BEEF PLUS. [Online]. [<http://www.verifiedbeef.ca/>].
- 23 CANADA. Safe Food for Canadians Regulations (SOR/2018-108), updated to April 16, 2024, [Canada], Justice Laws Website, 2019.
- 24 QUÉBEC. Animal Welfare and Safety Act, CQLR c b-3.1, updated to February 20, 2024, [Québec], Québec Official Publisher, 2015.
- 25 LECERF, Jean-Michel. "La place de la viande dans la nutrition humaine : Intérêt nutritionnel et effets sur la santé de la consommation de viande", [Online], *Vandes & Produits Carnés*, November 4, 2014. [https://www.viande-set-produitscarnes.com/phocadownload/vpc_vol_30/3065_lecerf_place_viande_dans_nutrition_humaine.pdf].
- 26 CANADA. Criminal Code, RSC 1985, c C-46, sec. 445, updated to January 14, 2024, [Canada], Justice Laws Website, 1985.
- 27 • NATIONAL FARM ANIMAL CARE COUNCIL. Code of Practice for the Care and Handling of Beef Cattle, 2013, 68 pp. Also available online: <https://www.nfacc.ca/codes-of-practice/beef-cattle>.
- NATIONAL FARM ANIMAL CARE COUNCIL. Code of Practice for the Care and Handling of Veal Cattle, 2017, 91 pp. Also available online: <https://www.nfacc.ca/codes-of-practice/veal-cattle>.
- 28 GOUVERNEMENT DU QUÉBEC. Rapport d'application : Loi sur le bien-être et la sécurité de l'animal, 2020, 60 pp. [https://www.mapaq.gouv.qc.ca/SiteCollectionDocuments/Santeanimale/Bien-etreanimal/Rapport_application_loi_bien_etre_animal.pdf].
- 29 GOVERNMENT OF CANADA. Canada's food guide. Health Canada. [<https://food-guide.canada.ca/en/healthy-eating-recommendations/limit-highly-processed-foods/>]
- 30 WORLD HEALTH ORGANIZATION. Cancer: Carcinogenicity of the consumption of red meat and processed meat, [Online], 2019. [<https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat>] (Accessed May 26, 2019).
- 31 AMERICAN COLLEGE OF PHYSICIANS. "Unprocessed Red Meat and Processed Meat Consumption: Dietary Guideline Recommendations From the Nutritional Recommendations (NutriRECS) Consortium", *Annals of Internal Medicine*, vol. 171, no 10, October 1, 2019. [<https://www.acpjournals.org/doi/10.7326/m19-1621>].
- 32 GOUVERNEMENT DU CANADA. Foire aux questions – Stimulateurs de croissance hormonaux, Santé Canada, [En ligne], 2012. [<https://www.canada.ca/fr/sante-canada/services/medicaments-produits-sante/medicaments-vegetaux/infofiches-faq/stimulateurs-croissance-hormonaux.html>] (Consulté le 19 juin 2019).

32 GOVERNMENT OF CANADA. Questions and Answers - Hormonal Growth Promoters, Health Canada, [Online], 2012. [<https://www.canada.ca/en/health-canada/services/drugs-health-products/veterinary-drugs/factsheets-faq/hormonal-growth-promoters.html>] (Accessed June 19, 2019).

33 INSTITUT NATIONAL DE LA SANTÉ PUBLIQUE DU QUÉBEC. L'usage des stimulateurs de croissance en production animale : positions des experts et des gouvernements, November 16, 2021, 57 pp. [Report from the Institut national de santé publique du Québec].

34 GOVERNMENT OF CANADA. Canadian Antimicrobial Resistance Surveillance System - Update 2018: Executive Summary, [Online], updated to May 1, 2019. [<https://www.canada.ca/en/public-health/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2018-report-executive-summary.html>] (Accessed June 19, 2019).

35 Les Producteurs de bovins du Québec.

36 MINISTÈRE DE L'AGRICULTURE, DES PÊCHERIES ET DE L'ALIMENTATION DU QUÉBEC. Usage des antibiotiques chez les animaux, [Online], updated to February 23, 2023. [https://www.mapaq.gouv.qc.ca/fr/Productions/santeanimale/maladies/antibio/Pages/utilisation_antibiotiques.aspx] (Accessed June 19, 2019).

37 GOVERNMENT OF CANADA. Responsible use of Medically Important Antimicrobials in animals, Health Canada, [Online], updated to January 3, 2018. [<https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance/animals/actions/responsible-use-antimicrobials.html>] (Accessed June 19, 2019).

38 CANADIAN ANIMAL HEALTH SURVEILLANCE SYSTEM. Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) 2023, November 22, 2023, 120 pp. [Report from Public Health Agency of Canada].

39 • AGENCE NATIONALE DE SÉCURITÉ SANITAIRE ALIMENTATION, ENVIRONNEMENT, TRAVAIL. Résapath, Réseau d'épidémiologie de l'antibiorésistance des bactéries pathogènes animales, bilan 2019, Novembre 2020, 155 pp.
• FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. NAP AMR The Netherlands Reduction in Antimicrobial Usage in Animals – Do We See Effects on Antimicrobial Resistance?, November 20, 2017, 18 pp. [<https://www.fao.org/fishery/static/AMR17/presentations/07%20Haenen.pdf>].

40 GOUVERNEMENT DU QUÉBEC. Règlementation sur l'utilisation des anti-biotiques chez les animaux, [Online], updated to January 9, 2024. [<https://www.quebec.ca/agriculture-environnement-et-ressources-naturelles/sante-animale/usage-antibiotiques/reglementation>] Accessed May 25, 2023.

41 BERGEN, Reynold. "Beef's water Footprint and Sustainability", [Presented as part of the annual general meeting of the Producteurs de bovins du Québec on April 3, 2019]. Information from the Beef Cattle Research Council website. [<https://www.beefresearch.ca/topics/hormones-other-growth-promotants-in-beef-production/>] Accessed May 25, 2023.



Useful links

bovin.qc.ca / beefresearch.ca / verifiedbeef.ca / cattle.ca



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