



Collaborative Campaigning for Food Sovereignty & Environmental Justice

March 28, 2023

Response to the Sustainable Agriculture Strategy Consultation, Agriculture and Agri-Food Canada

The Canadian Biotechnology Action Network (CBAN) brings together 15 groups to research, monitor and raise awareness about issues relating to genetic engineering in food and farming. CBAN members include farmer associations, environmental and social justice organizations, and regional coalitions of grassroots groups. CBAN is a project of MakeWay's shared platform. www.cban.ca www.gmo inquiry.ca/environment

Canada's Sustainable Agriculture Strategy should require rigorous regulation of genetic engineering (genetically modified organisms or GMOs), and should support organic agriculture.

The proposed Sustainable Agriculture Strategy

The federal government is consulting on a Sustainable Agriculture Strategy **at the same time that it is proposing to remove independent government environmental safety assessments of many gene-edited seeds and foods**, and proposing to allow the release of unreported gene edited seeds, a decision that would threaten the viability of organic farming which is one concrete key contributor to sustainable agriculture. The federal government's approach to GMO regulation and to new gene-edited GMOs in particular, will undermine the Strategy's proposed guiding principles to be evidence-based, and to be transparent and accountable.

In particular, we raise our concern that "gene editing" is explicitly mentioned in the Strategy discussion document, in the context of research and innovation to support environment and climate outcomes, as one of very few specific technologies named (Page 8). At the same time, we note that "organic" is not mentioned at all, despite the existing, demonstrable contribution of organic food and farming to sustainable agriculture in Canada.

Recommendation:

The Minister of Agriculture and Agri-Food should ensure that the Canadian Food Inspection Agency retains full regulatory authority over all genetically engineered seeds such that regulators can conduct independent environmental safety assessments of all new GMOs, including all gene-edited seeds, and report the market entry of all new GMOs.

Recommendation:

The Sustainable Agriculture Strategy should acknowledge and build on the successes of organic agriculture in Canada as one system of ecological farming that is codified, transparent and accountable, is accessible for any farmer to adopt, has a proven track record, and already serves an important domestic and international consumer base.

Genetic engineering has a negative environmental track record

Genetic engineering is a threat to sustainable agriculture. Canada's regulation of genetic engineering in agriculture, and current regulatory guidance proposals on gene-editing in particular, threatens the future of an authentic and effective sustainable agriculture strategy. The environmental risks of genetic engineering need to be assessed

The short, limited history of genetic engineering in Canada already shows how the technology can contribute to the degradation of biodiversity and genetic diversity, and reduce related "environmental services."¹ For example: all GM crops currently grown in Canada are tolerant to one or more herbicides, herbicide sales have increased in Canada by 234% since GM crops were introduced (1994 - 2020), herbicide resistant weeds are evolving and spreading, and the use of herbicide-tolerant crops is correlated to the reduction of critical monarch butterfly habitat.²

Recommendation:

The protection of biodiversity needs to be a key priority, and this includes supporting on-farm agrobiodiversity and genetic diversity.

Recommendation:

An ambitious reduction in pesticide use needs to be a key goal of the Sustainable Agriculture Strategy.

Recommendation:

Canadian agricultural research and development needs to focus on prioritizing environmental and climate outcomes. This means shifting away from research dominated by the private sector, to farmer-led and public research that works to support food system transformation and agroecological food production systems that are truly sustainable, such as organic farming.

The Strategy proposes to be guided by "ensuring that scientific advice guiding decision-making is based on sound scientific principles and empirical data, accepted methodologies, and professional standards." However, the Canadian Food Inspection Agency and Health Canada are proposing to remove the independent oversight by government regulators from the science behind certain gene-edited products (those with no foreign DNA), resulting in an inability to verify that the products have been assessed for safety using "sound scientific principles and empirical data, accepted methodologies, and professional standards." This is particularly important because companies that wish to sell new gene-edited seed have an interest in down-playing any negative results. The potential unintended effects of genetic engineering on organisms need to be investigated as part of environmental safety assessment.³

The discussion document proposes that the Strategy be guided by the principle that it be “**transparent and accountable**”: “placing public good at the centre of all decision making, and making available all records of decisions and actions to the public.”

In order to measure the environmental outcomes of gene-edited or other genetically engineered organisms used in agriculture, they need to be identified and tracked in the food system. Without mandatory notification of all new GMOs coming to/on the market, as proposed by the Canadian Food Inspection Agency, there can be no **independent verification of environmental claims**.

Furthermore, proposed non-regulation of some gene edited seeds means that there will be no criteria around field testing in advance of commercialization - even GM plants that are not ultimately marketed could harm the environment as a result of escape and contamination from **unregulated test sites**. If a gene-edited plant has both negative qualities and weediness, it could become invasive and harm biodiversity. Without regulatory oversight, plant developers could deny responsibility, and the cost of the harms or mitigation would fall on the public or individual farmers.

Independent government oversight and public transparency is also key to **maintaining public trust** which is named in the discussion document as a benefit of the Strategy along with **maintaining competitiveness and consumer choice**. The discussion document recognizes that “consumers around the globe increasingly demand that their food is produced sustainably” and that “a Sustainable Agriculture Strategy would support Canada’s position as a key producer of in-demand sustainable food and agriculture products.” The Strategy should therefore support the ability of consumers to access organic and other non-GMO food choices.

Recommendation:

The Sustainable Agriculture Strategy should not assume that the use of genetic engineering, including gene editing, will be beneficial and/or safe for environmental release. Instead, government regulators should assess the risks and benefits of all GMOs, including via tracking that is enabled by mandatory notification of all GMOs released.

Online survey questions and answers

<https://agriculture.canada.ca/en/department/transparency/public-opinion-research-consultations/sustainable-agriculture-strategy>

➤ Which of the proposed goals for a Sustainable Agriculture Strategy do you agree with most? What would you add or change?

The proposed vision for the Strategy is written from a trade perspective i.e. that “Canada is recognized as a world leader in sustainable agriculture and agri-food production” including “to expand new markets and trade while meeting the expectations of consumers.” However, the Sustainable Agriculture Strategy should be more clearly rooted in the environmental protection goal of sustainable agriculture which includes supporting and protecting human health.

We agree, in particular, with the proposed goals that, “Environmental performance is improved in Canada's agriculture sector, contributing to the environmental, economic, and social benefit of all Canadians,” and that, “Canada has addressed data gaps and improved capacity to measure, report on, and track the environmental performance of the agriculture and agri-food sector.”

The federal government’s approach to the regulation of genetically engineered organisms (genetically modified organisms or GMOs) and new gene-edited GMOs in particular, will undermine the proposed guiding principles that the Strategy be evidence-based and be transparent and accountable and it undermines the considerations named of supporting farmer livelihoods, maintaining global competitiveness, and maintaining public trust.

➤ **What should a Sustainable Agriculture Strategy aim to achieve in the agriculture sector in terms of:**

- **Climate change mitigation**
- **Adaptation**
- **Biodiversity**

Protecting biodiversity needs to be a key priority of a Sustainable Agriculture Strategy, and this includes supporting on-farm agrobiodiversity and genetic diversity. On-farm seed, breed, and crop diversity is key to making our food and farming systems resilient and adaptable in the face of a changing climate.

In contrast, the use of a few major genetically engineered (genetically modified or GM) crops - and related pesticide use - has had a number of negative impacts on biodiversity. In light of these impacts, and in light of the Strategy discussion document’s mention of the new genetic engineering techniques of gene editing, we advise that the Strategy should not assume that the use of genetic engineering will be beneficial and/or safe for environmental release. The Strategy should aim to substantially reduce pesticide use, in accordance with the commitment Canada made at the United Nations Convention on Biological Diversity COP15 to halve pollution from all sources and reduce the overall risk from pesticides by at least half, by 2030 (Target 7).

The impacts of genetically engineered crops thus far demonstrate the need for more rigorous government environmental safety assessments, as well as for monitoring and post-market assessments. We note, however, that the Canadian Food Inspection Agency is proposing to allow product developers to undertake environmental assessments for some gene-edited seeds without independent regulatory oversight. We urge the Minister of Agriculture and Agri-Food to ensure government oversight and transparency for all genetically engineered seeds, including all gene edited seeds.

Gene flow from GM crops can pose a threat to wild and weedy crop relatives. GM contamination also puts organic and other ecological farming at risk. For example, the use of canola as a crop was largely lost to organic grain farmers in Canada due to widespread GM canola contamination.⁴ The threat of GM contamination was a key consideration leading to farmer protest over the introduction of GM alfalfa.⁵ There have already been escape events in Canada with GM canola, flax, wheat, and pigs.⁶

All GM crops currently grown in Canada (GM soy, canola, corn, sugarbeet, and alfalfa) are herbicide tolerant, and most are glyphosate-tolerant. Increased use of glyphosate has

resulted in the emergence and spread of glyphosate-resistant weeds, with environmental and economic consequences, including increased herbicide use as farmers use tank mixes with additional herbicides to control glyphosate-resistant weeds. In response, biotechnology companies have introduced genetically engineered seeds tolerant to the older herbicides 2,4-D and dicamba, and stacked multiple herbicide tolerant traits together. The use of these GM crops will further increase the herbicide load in the environment and lead to the evolution and spread of more herbicide-resistant weeds.

The use of herbicide-tolerant crops also reduces weed diversity in and around fields, which in turn reduces habitat and food for other important species, including important pollinator species. One example is the migratory monarch butterfly, which travels between Mexico, the US and Canada every year, and relies on milkweed species as a food source and host for its eggs. Due to the increasing use of glyphosate in Canada and the US, which in turn has been driven by the increasing cultivation of GM herbicide-tolerant crops, milkweed populations in fields have declined significantly. In 2016, the Committee on the Status of Endangered Wildlife in Canada stated that Milkweed decline is strongly correlated with the use of herbicide-resistant crops and recommended that the monarch be designated as endangered in Canada.⁷

The only other GM trait in use in Canada, and currently all stacked with herbicide tolerant traits, is insect resistance (Bt).⁸ The Canadian government has not monitored the impact of Bt crops on insecticide use. However, insects are beginning to develop resistance to Bt crops in Canada, as they have in the US and other countries, and farmers are turning to other insecticide applications to control them. Additionally, Bt plants themselves produce insecticidal toxins that are released into the environment. Studies have observed that Bt crops can have negative impacts on non-target insects, including pollinators, and soil and aquatic organisms.

- **Water**

- **Soil health**

➤ **How can a Sustainable Agriculture Strategy support an environmentally, socially, and economically sustainable agriculture sector?**

To support an environmentally, socially, and economically sustainable agriculture sector, a Sustainable Agriculture Strategy needs to recognize the central role of farmers in on-farm agroecological innovation and the role of farmer practice as innovation. The Strategy needs to prioritize supporting and building on the proven sustainable practices of organic and ecological farmers, and turn to them for their expertise.

In order to “ensure that a Sustainable Agriculture Strategy maximizes positive outcomes and that addressing one environmental issue does not lead to other environmental, social, or economic challenges,” the Strategy needs to incorporate mechanisms to assess the benefits and risks of using new genetic technologies, rather than, as proposed for gene-editing, simply assuming that benefits exist and that the technology is risk-free.⁹

➤ **What success stories can you share about approaches to improve environment and climate outcomes in the sector? In what way have those approaches impacted yields or costs?**

Organic farming in Canada is a success story with great potential to grow, to further improve environment and climate outcomes. Organics already contributes over \$9.35 billion

to the Canadian food economy and provides an important choice to Canadian consumers. Certified organic production also provides price premiums to farmers, providing higher incomes for farmers and allowing them to adopt other beneficial practices aligned with organic production, such as preservation of biodiverse field margins and wetlands. The Strategy should support organic farming which uses an ecological approach, following specific practices as stipulated in the Canadian Organic Standards. The national standards describe organic production as based on principles that support healthy practices: "These principles aim to increase the quality and the durability of the environment through specific management and production methods. They also focus on the humane treatment of animals."

➤ **What suggestions do you have for additional approaches that could be part of a Sustainable Agriculture Strategy to:**

○ **Support environment and climate outcomes in the agriculture sector in general?**

The Strategy must focus on transforming the food and agriculture system to shift away from the use of genetic engineering and agrochemicals.

With regard to genetically modified organisms (GMOs), the 2011 People's Food Policy recommended: "1) Democratize science and technology policy and integrate the precautionary principle into all stages of decision-making. 2) GMOs are living pollution that self-replicate. They cannot be recalled or controlled once they have been released and can spread and interbreed with other organisms, thereby contaminating ecosystems and affecting future generations in unforeseeable and uncontrollable ways. Genetically Modified (GM) crops threaten agro-biodiversity which is fundamental to global food security, as well as threaten the future of organic food and farming through contamination. Existing GM crops should be phased out and there should be no further approvals of GM crops and animals. A just transition process, including financial and technical support, needs to be established to assist farmers to shift back to non-GM seed sources and to adopt ecological agriculture practices. 3) The power over seeds, and potentially breeds, represented by monopoly control has become a mechanism for transferring wealth from farmers and rural communities into the hands of corporations and their shareholders. Canada's patent legislation should be amended to explicitly disallow the patenting of life, including living organisms and genetic sequences. 4) Protect and support the open and free sharing of non-transgenic seeds and breeds as a fundamental practice of agriculture. 5) Establish a national ban on "terminator" technology and actively support the existing international ban at the United Nations Convention on Biological Diversity."¹⁰

○ **Support the agriculture sector in reaching net-zero by 2050?**

➤ **Given the pace of change needed, in which areas could regulatory approaches or changes to existing ones be used to accelerate environment and climate action?**

Careful independent government regulation to assess the environmental safety of GMOs, including new gene-edited seeds, needs to be upheld and strengthened. Accelerating the introduction of new GMOs without government oversight, as proposed by the Canadian Food Inspection Agency, will increase the environmental risks posed by new GMOs and could result in serious, irreversible environmental harm.

As seen with the introduction of herbicide tolerant GMOs in Canada, without a fulsome assessment of the risks, short term gain (in this case, convenient and efficient herbicide

application) can turn into systemic negative environmental and economic impacts (increased use of herbicides and evolution and spread of herbicide-tolerant weeds).

> What type of research should be prioritized to advance environment and climate outcomes in the sector?

Canadian agricultural research and development needs to shift away from research dominated by the private sector, to farmer-led and public research that works to support food system transformation and agroecological food production systems that are truly sustainable. In particular, Canadian agricultural research and development needs to focus on supports for organic agriculture which includes a shift of primary focus from inputs to practices.

Most of the crop varieties that are the base of our food system were developed by farmers and by public institutions, and are considered public goods.¹¹ As recently as in the early 1980s, the public sector in Canada was responsible for 95% of plant breeding, and 100% of breeding for cereal crops and oilseeds.¹² Over the past two decades, however, the federal government dismantled much of the public plant breeding infrastructure in Canada, shifting increased responsibility for plant breeding to the private sector.¹³

However, large seed companies focus on developing products that are profitable for them but not necessarily the best for farmers and Canadians, or designed to mitigate climate change and other environmental damage. For example, the companies that develop GM seeds have little financial interest in developing varieties suited to Canada's relatively small seed markets. Large seed companies also sell agrichemicals, and have produced GM varieties designed to increase sales of their herbicides. As plant breeding increasingly shifts into private hands, farmers pay more for seeds that are less well adapted to their regions and less resilient to climate change.¹⁴

The markets for genetically engineered crops are dominated by six seed and agrochemical companies. The unprecedented high level of corporate concentration in the seed market has already meant higher prices, limited choices for farmers, a narrowing of genetic diversity in crops, and stagnating innovation. Our research indicates that the use of gene editing will significantly increase plant-related patents and will also lead to more crop kinds with patented GM traits on the market.¹⁵

A March 2023 report from the United States Department of Agriculture confirms that seed industry consolidation and restrictive intellectual property regimes are stifling small, independent, and public seed breeding programs.¹⁶

Patents over GM technology also make it more difficult and more expensive for public institutions to conduct research. Patents and private control over breeding stifle the development of new agricultural research for the public and environmental good instead of encouraging innovation.

Public breeding is economically efficient. Research shows that when the Canadian federal government invests \$30-million a year in wheat breeding, it creates \$600-million in value, in the form of better crops, income for wages, taxes, and additional research resources.¹⁷ Private breeding is much less efficient. For example, a \$25-million annual public investment in wheat generated a similar yield increase to an \$80-million private investment in canola breeding. 50 In addition, the canola varieties developed by the private sector would not have been possible without many years of public research on canola.¹⁸

➤ **What kind of data are most important for measuring environmental and climate outcomes in the sector?**

In order to assess the risks and benefits of gene-edited and other genetically engineered organisms (genetically modified organisms or GMOs) used in agriculture, they need to be identified and tracked in the food system. Without mandatory notification of new GMOs coming to/on the market, there can be no independent verification of claims made about environmental and climate outcomes. We cannot leave data collection and reporting to product developers without government oversight, verification, and assessment mechanisms.

The federal government does not track which GM crops are commercialized, how much or where GM crops are grown, and the Canadian Food Inspection Agency is now proposing to allow some GM seeds onto the market without any notification to the government. The federal government needs to implement mandatory reporting and Statistics Canada needs to be charged with collecting data on plantings of genetically engineered crops in each province, by seeded acreage, crop type, and GM trait.

Public participation in decision-making over genetic engineering would also enhance the ability of the government to assess the environmental and social benefits and risks. Canadian regulation of genetic engineering needs to consider non-scientific concerns such as social, cultural and market impacts in addition to rigorous scientific evaluations, and include consultations with farmers and consumers. In the absence of democratic process, GMOs are being introduced, such as the GM non-browning apple and GM herbicide-tolerant alfalfa, that have little social utility and, on the contrary, have been opposed by farmers as posing environmental and economic risks.

In addition, pesticide use must be monitored and reported in meaningful ways. Historically, the government has not collected any data on pesticide use. This gap in information was critiqued by Canada's Commissioner for the Environment and Sustainable Development in 1999. The Commissioner reported to Parliament that, "without such data, Canada has no ability to accurately measure amounts of pesticides used and released into the environment. This information is needed to monitor the risks to health, safety and the environment."¹⁹ Environment Canada echoed this assessment in a 1996 report: "the lack of more detailed data about pesticide production, use, emissions and effects over time represents a significant impediment to adequate tracking of these substances."²⁰

In 2006, the federal government made it mandatory for companies to report their pesticide sales information. However, reporting by the Pest Management Regulatory Agency allocates pesticide sales to broad categories, on a national basis, and is often released after delays that hinder tracking trends and responding to emerging problems. Our analysis of data from the pesticide sales reports, and older data from the United Nations Food and Agriculture Organization and other sources show that **herbicide sales in Canada have increased by 234% since GM crops have been introduced, between 1994 and 2020.**

Detailed reporting of pesticide use, including geographical and crop distribution and pesticide-use intensity, will help to understand the impact of pesticides on the environment. Such data in the context of an ambitious pesticide reduction goal, needs to be an essential component of a strategy to mitigate climate and environmental harm.

➤ **What suggestions do you have for improving how environmental data is collected and shared in the sector?**

It is imperative that regulators have access to the science behind all genetically engineered products on the market, are engaged in independent environmental safety assessment of these organisms, including pre-market field testing, and that all GMOs are independently tracked and traced. The Strategy proposes to be guided by “ensuring that scientific advice guiding decision-making is based on sound scientific principles and empirical data, accepted methodologies, and professional standards.” However, in the case of genetic engineering, the Canadian Food Inspection Agency and Health Canada are proposing to remove the independent oversight of government regulators from the science behind certain gene-edited products (those with no foreign DNA), resulting in an inability to verify that the products have been assessed for safety using “sound scientific principles and empirical data, accepted methodologies, and professional standards.”

Furthermore, as proposed by the Canadian Food Inspection Agency, without information on all the GMOs released, environmental data collection will not be possible.

➤ **What qualitative or quantitative targets do you feel would be realistic, ambitious, and measurable to generate the most action in the following:**

Final Questions:

➤ **Do you have any other ideas, comments, feedback or suggestions to share on a Sustainable Agriculture Strategy?**

The role of genetic engineering in contributing to sustainable agriculture cannot be assumed. The history of genetic engineering thus far shows that there are potential serious environmental, social, and economic costs of introducing GMOs. The risks and benefits of using GMOs in agriculture need to be independently assessed by government regulators.

¹ Canadian Biotechnology Action Network. 2015. Are GM Crops Better for the Environment? www.gmoenquiry.ca/environment

² Committee on the Status of Endangered Wildlife in Canada. 2016. COSEWIC Assessment and Status Report on the Monarch *Danaus plexippus* in Canada. https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_Monarch_2016_e.pdf

³ Testbiotech and the Canadian Biotechnology Action Network. 2022. “Unintended effects caused by techniques of new genetic engineering create a new quality of hazards and risks” March. www.cban.ca/NewGERisksReport

⁴ Organic Agriculture Protection Fund of SaskOrganics. <http://oapf.saskorganic.com/>

⁵ Request for Environmental Assessment of Genetically Engineered Roundup Ready Alfalfa: 2013 <https://cbac.ca/wp-content/uploads/Application-File-for-Public-Distribution-RRA-July-2013.pdf>

⁶ Canadian Biotechnology Action Network. 2019. GM Contamination in Canada: The failure to contain living modified organisms – incidents and impacts. www.cban.ca/ContaminationReport2019

⁷ Committee on the Status of Endangered Wildlife in Canada. 2016. COSEWIC Assessment and Status Report on the Monarch *Danaus plexippus* in Canada. https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_Monarch_2016_e.pdf

⁸ Canadian Corn Pest Coalition. 2023. Bt Corn Products Available as of March 2023. <https://cornpest.ca/wp-content/uploads/2023/03/Canadian-Bt-Traits-Table-March-2023-English-4.pdf>

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- ⁹ Testbiotech and the Canadian Biotechnology Action Network. 2022. “Unintended effects caused by techniques of new genetic engineering create a new quality of hazards and risks” March. www.cban.ca/NewGERisksReport
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- ¹³ National Farmers Union. 2004. Plant Breeding in Canada: Public or Private? NFU Seeds Factsheet #3. http://www.nfu.ca/sites/www.nfu.ca/files/NFU_Seeds_Fact_Sheet_3_0.pdf
- ¹⁴ Ibid.
- ¹⁵ Canadian Biotechnology Action Network. 2022. Patents on Genome Editing in Canada, March 3. www.cban.ca/GenomeEditingPatents
- ¹⁶ United States Department of Agriculture, Agricultural Marketing Service. 2023. More and Better Choices for Farmers: Promoting fair competition and innovation in seeds and other agricultural inputs. March. <https://www.ams.usda.gov/sites/default/files/media/SeedsReport.pdf>
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- ¹⁸ Gray, R and Malla, S. 2007. The rate of return to agricultural research in Canada. Canadian Agricultural Innovation Research Network (CAIRN) Policy Brief Number 11.
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- ²⁰ Environment Canada. 1996. State of Canada’s Environment 1996. Quoted in Boyd, D., 2001. Canada vs. The OECD: An Environmental Comparison. Victoria, Eco-Research Chair in Environmental Law and Policy